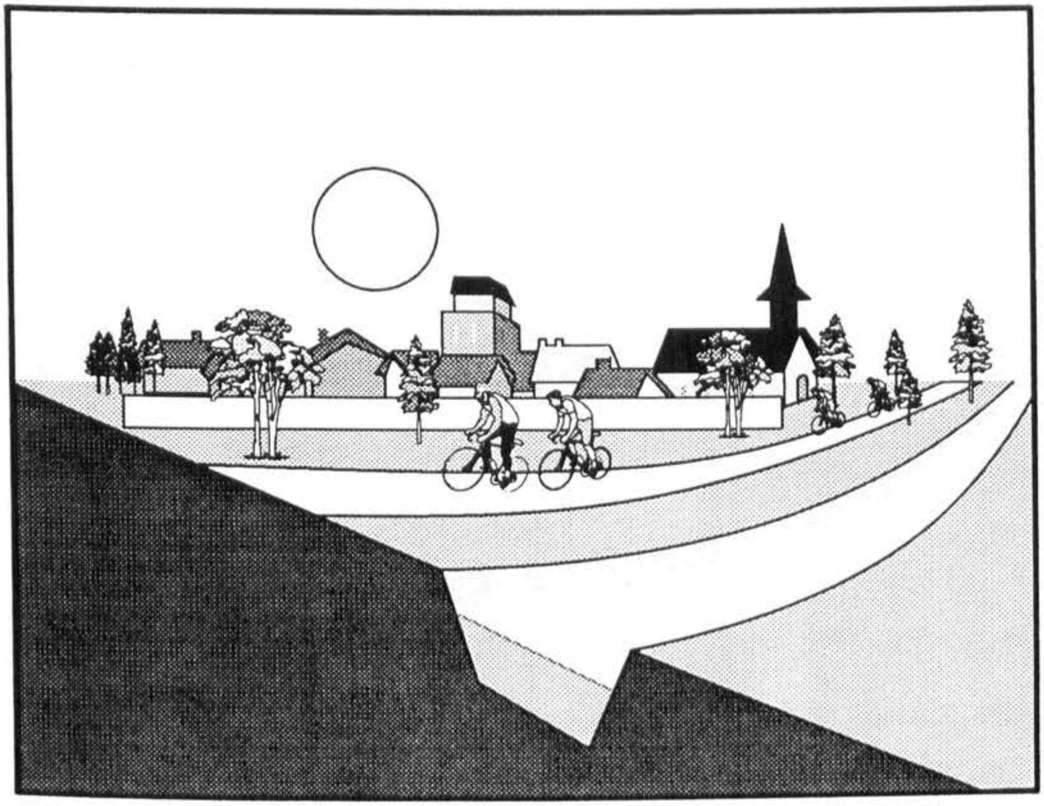
US Army Corps
of Engineers
New Orleans District

DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
DOTD

Amite River and Tributaries, Louisiana

East Baton Rouge Parish Watershed
Flood Control Projects



Feasibility Study

Volume 1 of 4
Main Report
Environmental Impact Statement
February 1995

REVISED DRAFT

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SYLLABUS

The purpose of the overall Amite River and Tributaries study is to investigate the feasibility of providing flood protection for the residents in the Amite River Basin. This report documents the results of the feasibility phase studies for the East Baton Rouge Parish watershed. The goal of the study was to develop solutions to reduce flood damages along the tributary streams of the Amite and Comite Rivers in East Baton Rouge Parish. The study area encompasses about 560 square miles in southeastern Louisiana and contains the cities of Baton Rouge, Baker, and Zachary. Urban and built-up land comprise 40 percent of the existing land use. In 1991, the study area population was 384,000. East Baton Rouge Parish continues to grow with an expected 40% population increase by the year 2040. Numerous floods have occurred in the basin between 1973 and 1993. Flooding within the basin originates from excessive rainfall resulting in headwater and backwater overflow of the Amite River and tributary streams. The maximum flood of record occurred in 1983 and caused approximately $172 million in damages in the Amite River Basin. In the East Baton Rouge watershed, flood damages were estimated at $65 million.

Numerous structural and non-structural measures were considered to reduce flood damages in the East Baton Rouge Parish watershed. The tentatively selected plan calls for channel modifications to five watersheds within the parish of East Baton Rouge. These watersheds are Blackwater Bayou and its main tributary, Beaver Bayou, Jones Creek and tributaries, Ward Creek and tributaries, and Bayou Fountain. The plan consists of modifying approximately 66 total miles of channel. Of this total, approximately 25 miles minimal channel clearing and snagging, 24 miles of earthen channel enlargement, and 17 miles of channel concrete lining are proposed. Included in the proposed construction are 60 miles of stream bank aesthetic tree planting. Fish and wildlife mitigation features consist of the reforestation of 397 acres of cleared land to compensate for an estimated 280 acres of bottomland hardwoods that would be lost to project construction. Recreation features include an 11-mile bicycle path. The total first cost of the plan, in second quarter 1994 dollars, is estimated at $109,100,000 which translates into an average annual cost of $10,921,000 based on an interest rate of 8 percent, amortized over 50 years. This cost includes interest lost during construction and expected operation, maintenance, repair, and rehabilitation. The total average annual benefits attributed to the plan are estimated at $24,358,000. The benefit/cost ratio of the total plan is 2.23 to 1.

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STUDY AUTHORITY

The Amite River and Tributaries Study is being conducted in response to a resolution of the committee on Public Works of the United States Senate. The resolution, sponsored by the late Senator Allen J. Ellender and Senator Russell B. Long of Louisiana, was adopted on April 14, 1967, and reads as follows:

> "RESOLVED BY THE COMMITTEE ON PUBLIC WORKS OF THE UNITED STATES SENATE, That the Board of Engineers for Rivers and Harbors, created under Section 3 of the River and Harbor Act approved June 13, 1902, be, and is hereby requested to review the report of the chief of Engineers on Amite River and Tributaries, Louisiana, published as House Document Numbered 419, Eighty-fourth Congress, and other pertinent reports, with a view to determining whether the existing project should be modified in any way at this time with particular reference to additional improvements for flood control and related purposes on Amite River, Bayou Manchac, and Comite River and their tributaries."

STUDY PURPOSE AND SCOPE

The purpose of the study is to investigate the feasibility of providing flood protection for the residents in the Amite River Basin. This study is being conducted in two phases: a reconnaissance phase and a feasibility phase. The reconnaissance phase was initiated in September 1983 and completed in February 1985 with the signing of a feasibility cost-sharing agreement (FCSA). The cost-sharing partner is the Louisiana Department of Transportation and Development, Office of Public Works (DOTD). The feasibility phase was initiated in April 1985. In January 1986, notification was received from the Secretary of the Army Office that cost-sharing on Corps feasibility studies would be implemented on January 15, 1986. Specific terms of the Amite River and Tributaries study cost-

sharing agreement stipulates that cost would be shared 50-50, commencing 60 days after the decision to proceed with cost-sharing. Therefore, all costs incurred after March 15, 1986, were cost-shared on this study. In February 1990, this cost-sharing agreement was modified to include the investigation of the Darlington Dam and Reservoir. The feasibility cost-sharing agreement is contained in Appendix A.

The Amite River Basin is shown on Plate 1. The basin encompasses about 2,200 square miles in southeastern Louisiana and southwestern Mississippi that is drained by the Amite River and tributaries. It includes portions of East Baton Rouge, Ascension, Livingston, East Feliciana, St. Helena, Iberville, St. James, and St. John the Baptist parishes in Louisiana and Wilkinson, Lincoln, Franklin and Amite counties in Mississippi. The 170-mile-long Amite River and its right bank tributary, the Comite River, rise in southwestern Mississippi and flow generally southward to their confluence east of Baton Rouge in the vicinity of Denham Springs. From that point, the Amite River continues in a southerly direction to a juncture with Bayou Manchac at about mile 36 and then southeasterly and easterly to Lake Maurepas. Bayou Manchac, a right bank tributary of the Amite River and a former distributary of the Mississippi River at Mile 215 above the Head of Passes (AHP), extends about 17 miles eastward between the Mississippi River and Amite River at Mile 36. Major urban centers in the basin include Baton Rouge, Baker, Zachary, Gonzales, Sorrento, and Denham Springs, Louisiana.

Due to the complex nature of the flood problem, feasibility phase studies were divided along hydrological and political boundaries to advance the study process. Studies have been completed for the following areas:

Comite River Basin (complete)
Darlington Resevoir (complete)
Ascension Parish (study terminated;
  local program implemented)

Studies are being conducted for the following areas:

East Baton Rouge Parish (this report)
Livingston Parish

This report is written to describe study efforts in East Baton Rouge Parish. It is an interim response to the study authorizing resolution. The goal of the study was to develop solutions to reduce flood damages associated with headwater and backwater flooding from major drainage streams in East Baton Rouge Parish. These streams and their tributaries include Beaver Bayou, Blackwater Bayou, Jones Creek, Claycut Bayou, Ward Creek, Bayou Fountain, and Bayou Manchac. See Plate 2.

Seven watersheds in East Baton Rouge Parish were studied (see Plate 2). It was determined that the hydrology of 4 of the 7 watersheds is, for all practical purposes, independent and improvements proposed for one watershed in most cases would not have a major impact on the other. Consequently, the analysis of alternative plans was conducted on a watershed by watershed basis. Pertinent data on the 7 watersheds are shown in Table 1.

There are several streams that drain East Baton Rouge Parish but were not considered in this study because they are in the rural portion where flood damages are minimal or where flood protection has been recommended by the Corps of Engineers as part of the Comite River Diversion Plan. They include Bayou Baton Rouge, Cypress Bayou, White Bayou, Lily Bayou, Comite River, and Hurricane Creek.

Flooding problems in the Monte Sano Bayou watershed were initially evaluated in the reconnaissance phase of the study. It was determined that modifications to privately owned structures would significantly improve drainage in the basin. Such modifications have been implemented by the owners. Further study of this watershed was therefore not continued.

This report addresses the causes and impacts of flooding along streams in East Baton Rouge Parish and evaluates measures to alleviate flood damages. This report documents the results of field investigations; hydrologic and hydraulic studies; economic and environmental analyses; Federal, state, and local coordination; and public involvement activities. Studies were made in the detail necessary for the comparison of alternative plans, the identification of the NED plan, and the development of recommendations for implementation of a recommended plan. The study also addresses the protection of fish and wildlife

habitat and the provision of regional recreational opportunities.

TABLE 1
WATERSHEDS OF EAST BATON ROUGE PARISH UNDER STUDY

Watershed	Basin Number	Total Acres
1. Beaver Bayou	14	7,927
2. Blackwater Bayou	13	9,341
3. Jones Creek	22	10,730
Lively Bayou Tributary	23	1,150
Lively Bayou	24	3,105
Weiper Creek	28	1,829
Total Jones Creek		**16,814**
4. Ward Creek		
Bayou Duplainter	25	4,771
Upper Druson Creek	26	2,905
North Branch of Ward Creek	27	4,344
Lower Dawson Creek	30	2,207
Lower Ward Creek	32	7,077
Upper Ward Creek	21	6,474
Total Ward Creek		**28,278**
5. Bayou Fountain	29	25,808
6. Claycut Bayou	31	9,634
7. Bayou Manchac	60	7,548

Source: U.S. Army Corps of Engineers, New Orleans District

PRIOR STUDIES, REPORTS, AND EXISTING WATER PROJECTS

The pertinent studies and reports on water resources development in or near the study area by the U. S. Army Corps of Engineers and other Federal, state, and local agencies are described in the following paragraphs.

A preliminary evaluation report was prepared by the Corps of Engineers in May 1972. The evaluation was conducted under the authorizing resolution for this study. Four reservoir plans, two plans to divert flood waters from the Amite River Basin to the Mississippi River, and four channel modification plans were investigated. All 10 plans were determined to be economically infeasible. This study was placed on the inactive status in February 1974.

A second reconnaissance study of the Amite River and Tributaries was initiated and subsequently completed by the Corps of Engineers in December 1984. In this initial evaluation report, a number of alternative solutions were developed to mitigate flood damages in the basin. A number of economically justified and environmentally acceptable plans were identified. The findings of this report provided the basis for the authorization of this feasibility study.

Section 206 of the 1960 Flood Control Act (PL 86-646), as amended by the 1960 and 1970 Flood Control acts, the Water Resources Development Act of 1974 and Executive Order 11296, August 10, 1966, authorizes the Corps of Engineers to establish and carry out a Floodplain Management Service Program. The objective of the program is comprehensive flood damage prevention planning that encourages wise use of the floodplain at all levels of government. Under the program, the Corps prepared five floodplain information reports for East Baton Rouge Parish. They are:

NAME OF STREAM	DATE PREPARED
Bayou Fountain	June 1971
Ward Creek and Tributaries	October 1972
Clay Cut Bayou, Jones Creek and Tributaries	September 1974

Hurricane Creek, Monte Sano Bayou and Tributaries	November 1976
Cypress Bayou and Tributaries	November 1976

The Corps of Engineers prepares flood insurance studies to map eligible communities by risk zones and to determine insurance rates. The studies are made under the provisions of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. The program is administered by the Federal Insurance Administration of the Federal Emergency Management Agency. The flood insurance studies prepared for East Baton Rouge Parish are:

City of Baker; May 15, 1985
City of Zachary; August 3, 1982
East Baton Rouge Parish; May 17, 1993

The Department of Transportation and Development contracted with Brown and Butler Inc., to investigate the feasibility of a reservoir near Darlington, Louisiana. The proposed reservoir would have a maximum water surface area of about 19,500 acres and a normal water surface area or recreation pool of about 15,000 acres. The study, completed in March 1984, determined that the reservoir was economically feasible and recommended that the Amite River Basin Drainage and Conservation Commission investigate methods to fund the project.

The Department of Transportation and Development contracted with Brown and Butler, Inc. in May 1985 to investigate the hydraulic and hydrologic parameters in more detail than was in the previous study completed in March 1984. In the study, topographic surveys were taken of the Amite River valley from Interstate Highway 12, hydraulic model, were developed, and several reservoir designs were analyzed. The study was completed in August 1986. It concluded that the hydrologic and hydraulic analyses conducted as part of this study confirms the related findings of the previous study completed in March.

The Department of Transportation and Development (DOTD) applied to the U.S. Corps of Engineers for a Section 404 permit in April 1985 to construct the Darlington Reservoir. DOTD contracted with Espey Houston and Associates, Inc., in December 1987 to develop the necessary engineering and environmental

information for the Corps of Engineers to prepare an environmental impact statement. The study was completed in January 1990. In early 1990, however, the State officially withdrew this permit application and requested Federal participation in this project.

The Corps of Engineers completed a feasibility study of flood control measures in the Comite River Basin in September 1990. Numerous structural and nonstructural measures were considered to reduce flood damages along the Comite River and lower tributary streams and to a lesser extent along the Amite River. The recommended plan consists of a 12-mile diversion channel from the Comite River to the Mississippi River. Major features of the plan include a Diversion Structure, a Comite River Stage Control Structure and a levee, a Channel Stage Control Structure, and an 8-mile levee along the southern bank of the diversion channel and recreation facilities. See Plate 3. Detailed design of the project is currently in progress and is expected to be completed in 1995. This project will be cost-shared with the State of Louisiana.

The Louisiana state legislature, in their 1982 regular session, created the Statewide Flood Control Program by Act 351. The purpose of the program is to provide assistance to the parish and local governments in reducing flood problems. Guidelines and procedures for participating in the program were completed and distributed by the flood control project evaluation committee in March 1983. Through 1988, one drainage project has been funded in the Amite River Basin. East Baton Rouge parish proposed to enlarge Beaver Bayou. Land acquisition for the project has been completed. Construction began in August 1988 and was expected to be completed in 200 working days. However, 1989 was a relatively wet year that slowed construction. Construction was completed in September 1990. The work is estimated to cost about $700,000. About 70 percent of the cost would be paid by the State-Wide Flood Control Program. East Baton Rouge Parish provided 30 percent of the cost including lands, easements, and rights-of-way.

In July 1990, Wilbur Smith Associates, Evans-Graves Engineers, and Chenevert-Soderberg Associates prepared a Comprehensive Land Use and Development Plan (known as the Horizon Plan) for the City of Baton Rouge and East Baton Rouge Parish. This study addresses current and future drainage and flood prevention needs of East Baton Rouge Parish and recommends parish-wide and specific watershed solutions to flooding problems. Recommendations include the following:

- implement a parish-wide drainage maintenance program
- implement local drainage improvements and support major drainage projects
- evaluate the potential of flood detention facilities within the Amite River Basin
- develop, maintain, and enforce a Master Drainage Plan and Drainage Criteria
- develop hydrologic and hydraulic modeling capabilities to predict drainage impacts of new development
- implement a public awareness program
- develop a long range plan for implementation and funding of a program to include other local agencies, the State, and Federal governments
- utilize subdivision requirements to secure drainage rights-of-way
- implement a parish-wide program to install and maintain survey benchmarks on a single datum.

The Metropolitan Council of the Parish of East Baton Rouge and the City of Baton Rouge officially approved the Horizon Plan, effective April 1992. Financing and implementation of various components of the plan are currently being developed.

On October 1, 1990, the Governor's Interagency Task Force on Flood Prevention and Mitigation completed an investigation to control and mitigate floods in the Amite River Basin. Flood control measures examined included floodplain management, stormwater retention, structural elevation and relocation, voluntary privately-owned retention ponds, zoning restrictions, habitat and ground cover preservation, and effective drainage improvements. Numerous short- and long-term recommendations were made including the following:

- implementation of floodplain regulatory standards
- implementation of a state-wide flood disclosure law
- a program for voluntary structure floodproofing, elevation relocation, or removal
- institution of a regional outreach awareness program
- improve existing flood forecasting and information
- implementation of a regional channel maintenance program
- assist the Federal Emergency Management Agency with their efforts
- assist local parishes and townships with the implementation of flood control projects
- assist with the implementation of the proposed Comite Diversion Canal
- pursue implementation of a full-size dry reservoir on the upper Amite River
- develop new, logical, cost-effective, and environmentally acceptable alternatives.

Under a cost-sharing agreement with the State of Louisiana, the Corps of Engineers completed feasibility studies for the Darlington Reservoir in September 1992. Findings indicated that construction of a reservoir, with or without a permanent recreation lake, was not economically feasible under Federal criteria. Federal participation in construction was therefore not recommended. The State is currently reviewing this report.

Under Section 22 of the Water Resources Development Act of 1974, as amended, the Corps of Engineers is currently conducting an initial evaluation investigation (reconnaissance study) of non-structural flood control measures for the Amite River Basin. Initial findings indicate that selected non-structural measures may be feasible in some locations.

Other Section 22 studies recently completed or in progress are:

- Development of a 2-foot contour map database of the Amite River Basin,

- Development of a digitized floodplain mapping of the Amite River Basin,

- Development of a digitized floodplain mapping of East Baton Rouge Parish,

- Study of erosion problems (solutions for the Baker Canal and Tributaries, East Baton Rouge Parish),

- Development of a drainage maintenance and construction program for East Baton Rouge Parish.

The existing Federal projects in or near the study area and their authorized features are:

The Amite River and Bayou Manchac navigation project, authorized 1927 and completed in 1928, provides for a 7- by 60-foot channel in the Amite River from its mouth at Lake Maurepas to mile 31 at Port Vincent (about 5 miles downstream of Bayou Manchac) and the clearing and snagging of the Amite River and Bayou Manchac from Port Vincent to the Kansas City Southern Railroad crossing at about mile 8.5 of Bayou Manchac.

The Amite River and Tributaries flood control project, authorized in 1955 and completed in 1964, provides for enlargement of the Comite River from Cypress Bayou (mile 10) to the mouth, clearing and snagging the Amite River from the Comite River (mile 54) to Bayou Manchac (mile 35.7), and enlarging and realigning the Amite River from Bayou Manchac to mile 25.3, a riprapped control weir on the south side of the Amite River at mile 25.3 and a diversion channel from the weir to Blind River at mile 4.8, snagging and clearing Blind River from mile 4.8 to Lake Maurepas, and snagging and clearing Bayou Manchac from the Amite River to Ward Creek (mile 8.4). A small navigation channel was provided around the weir between the Amite River and the diversion channel. Snagging and clearing Blind River from mile 4.8 to Lake Maurepas, although authorized, was found to be unnecessary after initial investigations. The Louisiana Department of Public Works enlarged the Comite River to dimensions considerably in excess of those to be provided under the project and extended the enlargement about 2 miles farther upstream.

The Federal Emergency Management Agency (FEMA) is currently in the process of instituting a floodway zone along Bayou Fountain. Once established, strict development requirements

will be in place. Such requirements will include prohibiting soil fill and mitigation of lost floodplain volume. Such restrictions will highly discourage development within the floodway zone.

Improvements by others in or near the study area and their features are:

The Louisiana Department of Public Works elected to construct the Federal enlargement of the Comite River as "equivalent work" in lieu of a cash contribution toward the Federal modification of the Amite and Comite Rivers. That agency elected to excavate a much larger channel than provided in the Federal plan. The bottom width was increased from 60 to 90 feet the depth was increased about 4 feet in the lower river and about 10 feet between miles 8 and 10, and the enlargement was extended about 1.1 miles upstream of Cypress Bayou, the head of the Federal project.

The Louisiana Department of Public Works in 1967, under the State-Parish Drainage Plan, enlarged White Bayou for a distance of about 8 miles upstream of Louisiana Highway 64. The lower 4.5 miles was enlarged to a 30-foot bottom width at a depth of about 14 feet. A smaller channel was provided in the upstream area.

The Louisiana Department of Public Works in about 1956, under the State-Parish Drainage Plan, enlarged White Bayou from Louisiana State Highway 64 about 2.4 miles southward and excavated channel (Baker Canal) generally southwestward through the town of Baker to Bayou Baton Rouge, a tributary of the Mississippi River.

Bayou Fountain was enlarged from its mouth to Louisiana State Highway 42 by the City of Baton Rouge, Department of Public Works. This enlargement was completed in 1955 and lowered stages due to headwater flooding.

Lively Bayou tributary was enlarged from the Illinois Central Railroad to Florida Boulevard in 1966. Prior to then the Lively Bayou tributary was improved from its mouth to the Illinois Central Railroad.

Jones Creek was improved from its mouth to its headwater a distance of 12.6 miles, and Lively Bayou was improved from its mouth to the Illinois Central Railroad, a distance of 3.5 miles. More than 3.2 miles of Weiner Creek was improved, including a diversion adjacent to the Lake Sherwood Acres subdivision.

In 1982, the City of Baton Rouge and the Parish of East Baton Rouge, Department of Public Works proposed a three phase channel modification plan for Beaver Bayou. Phase I extends from the mouth of Beaver Bayou to Greenwell Springs Road. Phase II and III extend from Greenwell Springs Road to Wax Road and from Wax Road to Hooper Road, respectively. Phase I consists of channel modifications deepening, and straightening. Phase I was later broken into two parts, Phase IA and IB. Phase IA extends from the mouth of Beaver Bayou to Frenchtown Road, a distance of 2.3 miles. Phase IB extends from Frenchtown Road to Greenwell Springs Road.

Phase IA originally called for deepening the channel by 2.5 feet at the mouth of Beaver Bayou (elevation 15.5 ft NGVD) to 4.0 feet at Frenchtown Road (elevation 20.0 ft NGVD). The channel would have been enlarged to a trapezoidal channel with a 60 foot bottom width and 2.5 on 1 side slopes. The channel length would have been reduced 500 feet by straightening a portion of the stream. However, during construction of Phase IA, a large degree of bank sloughing and backwater siltation from the Comite River occurred. As a result, Phase IA was modified. The existing channel invert at the mouth (18.0 ft NGVD) was retained. The channel was then excavated to 18.0 feet NGVD from the mouth to the point upstream where it intersected the original proposed channel invert. The bottom width and side slopes remained unchanged. This modified Phase IA was completed in 1990.

Channel improvements on the lower portion of the Ward Creek watershed were made by the State of Louisiana, Department of Public Works between September 1953 and May 1957. Improvements included realignments of some parts of the Ward Creek and excavation of the channel into a trapezoidal cross-section. The realignment portion of Ward Creek is approximately 3.5 miles long. All following references to this reach of Ward Creek pertain to the diversion canal. In addition, North

Branch Ward Creek was improved from its mouth to Florida Blvd, Dawson Creek was improved from it mouth to College Drive (a distance of 5.8 miles), and Bayou Duplantier was improved from its mouth upstream a distance of 1.2 miles. Ward Creek was concrete-lined in 1966-67 from Clay Cut Road to Government Street. Later, the concrete lining was extended beginning at the corporate limits near College Drive to the Choctaw Village Shopping Center at its head waters. Also, from 1966 to 1967, North Branch Ward Creek had some additional channel modification and some channel realignment from its mouth to Jefferson Highway. In the early 1960's, Bayou Duplantier was deepened for Mile 1.2 to Standford Avenue.

Since January 1957, the State of Louisiana, Department of Public Works, the City of Baton Rouge, and the East Baton Rouge Parish Department of Public Works have made channel modifications on Clay Cut Bayou and Jacks Bayou. On Clay Cut Bayou, the modification channel extends from its mouth at the Amite River to Floynell Drive at about Mile 10. The Jacks Bayou channel modification extends from its mouth to Sherwood Forest Blvd, a distance of about 2 miles.

The drainage work that East Baton Rouge Parish Public Work department has completed since 1980 is shown in Appendix B.

PLAN FORMULATION

ASSESSMENT OF WATER AND RELATED LAND RESOURCES PROBLEMS AND OPPORTUNITIES

The planning process for the East Baton Rouge Parish Flood study was conducted in an organized and systematic manner to ensure that all reasonable alternative plans were considered. The process was conducted in accordance with U. S. Water Resources Council "Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies" Plan Formulation for this study was an iterating and dynamic process. Plan formulation is directed at achieving the National Economic Development (NED) objective consistent with

protecting the nation's environment in accord with national environmental statutes, applicable executive orders, and other Federal planning requirements, as well as being responsive to state and local concerns. The NED objective was achieved by increasing the value of the national output of goods and services and reasonably maximizing net economic benefits. Benefits were maximized while giving due consideration to environmental quality, regional development, and social concerns.

During the process, historical trends and existing conditions were used as a base for forecasting future conditions. In an assessment of the nature and extent of changing conditions, problems and needs were identified and specific planning objectives defined. Opportunities in the form of management measures that address the objectives were evaluated. The most feasible measures were incorporated into an array of plans. The plans were then assessed and evaluated in terms of their engineering feasibility and performance and their adverse and beneficial effects on the NED objective. The effects on environmental quality were also evaluated. Finally, the plans were compared and a trade-off analysis performed to select the plan that best addresses the NED objective and to provide the rationale for the tentatively selected plan.

EXISTING CONTITIONS

Physiography and Geology

The parish is in the Southern Pine Hills of the Eastern Gulf Coastal Plain. Topography in the northern portion of the parish is dominated by plateaus and ridgetops underlain by the Citronelle Formation. The southern portion is dominated by gently sloping Pleistocene terrace surfaces.

The maximum elevation within the parish is approximately 500 feet MSL. Elevations are between 35 feet and 40 feet MSL near the junction of the Comite River and Amite River near Denham Springs. Minimum elevations are between 5 and 10 feet MSL in the lower part of the basin near Lake Maurepas.

Although older sediments are found at depth in the parish only the Plio-Pleistocene, and Holocene sediments exposed at

the surface and found near the surface are discussed. Four distinct geologic units are found within the parish: the Citronelle Formation, the Pleistocene terraces, the loess deposits and Holocene alluvium. The Citronelle Formation which varies in age from late Pliocene to Pleistocene, generally consists of a gradational sequence of fluvial gravels, cross bedded sands, silts and clays with the coarser grained material occurring at the base of this sequence. South of the outcrop of the Citronelle Formation are found the relatively flat Pleistocene terraces of less variable lithology than that of the Citronelle Formation. Generally, these terraces are comprised of sediments consisting of silt and sandy clay which grade downward into fine to coarse grained sand with some gravel. a thin veneer of loess deposits blankets much of the Comite River Basin. These loess deposits consist of silt with some clay and very fine sand which are irregular in occurrence and seldom exceed three feet in thickness. Holocene alluvium found along the Comite River and its tributaries consists of a sequence of fine sands and silts grading downward into coarse sands and gravels. The parish is located in a stable area of low seismicity. Earthquake activity is relatively rare and is usually less severe than average. Resulting damage to structures and levees (dikes) in the parish would be expected to be minor.

Economy

The economy of the parish is founded on a base of natural resources and government services. One of the largest oil refineries in the United States is located in Baton Rouge, Louisiana. The Port of Baton Rouge is the fifth largest in the United States and oil products and grains are the major products moved through the port. The city of Baton Rouge is the seat of the state capital and a large portion of the jobs are related to state government. Timber production in East Baton Rouge in 1992 accounted for less than one percent of the total stumpage value severed in Louisiana. The 1982 Census of Manufactures reported that eight percent of the state's manufacturing jobs in East Baton Rouge Parish. The capital city of Baton Rouge is the center of economic activity. Of the 198,000 people employed in the parish, nine percent were employed in public administration. Thirty-seven percent were employed in the service sector with another seventeen percent

employed in the retail trade. Manufacturing and construction accounted for eight and eleven percent, respectively. The remaining eighteen percent were spread throughout other sectors of the economy including agriculture, mining, wholesale trade, finances, and transportation.

Human Resources

The Parish population in 1991 was 383,983 an increase about 1.4 percent annually since 1970. Table 2 delineates the historic and existing population of the Parish and the Amite River Basin. The 1991 population of the city of Baton Rouge was 221,000 and represents over fifty-seven percent of the population in the Parish. Of the 380,000 inhabitants residing in the Parish in 1990, some were identified as being below established national poverty level. This represents twenty percent of the populace. In June 1993 the total workforce was 208,000 with 13,000 unemployed, unemployment rate of 6.4 percent.

TABLE 2

HISTORICAL POPULATION TRENDS IN EAST BATON ROUGE PARISH

	1940	1950	1960	1970	1980	1990	1991
East Baton Rouge	88,415	158,236	230,058	285,167	366,191	380,105	383,983

SOURCES: U.S. Army Corps of Engineers, New Orleans District Louisiana Tech University, College of Administration and Business, Research Division (1991 estimate)

In 1990, in East Baton Rouge Parish, there were some 161,700 identifiable households. The median income was $27,200.

The 1990 census reported that there were 157,000 year-round housing units in the Parish with 83,000 of the housing units owner occupied. The medial value of the owner occupied unit was $69,000.

Transportation

The parish is served by a fairly extensive transportation system. Deep-draft navigation access is provided to the Port of Baton Rouge by the Mississippi River. Shallow draft access is limited to the lower reach of the Amite River and Bayou Manchac. The shallow draft waterway is primarily used to transport dredged shell. An extensive network of highways serve the area. Interstate 12 and U.S. Highway 190 traverse the area east and west. Interstate 10 and U.S. Highway 61 run northeast and southeast. Several state and parish roads serve as transportation arteries between cities. They include 42, 30, 427, 37, 468, 64, 409, and 964. North-south rail transportation is provided primarily by the Louisiana-Arkansas Railway and the Illinois Gulf Central Railroad. The Illinois Gulf Central Railroad provides east-west transportation. Within the city of Baton Rouge and south along the Mississippi River, numerous local railway spurs serve the industries and manufacturers. Air transportation is provided at Ryan International Airport in Baton Rouge.

Climate

The climate of the area is humid subtropical, but is subject to significant polar influences during winter, as cold air masses periodically move southward over the area displacing warm moist air. Prevailing southerly winds create a strong maritime character. This movement from the Gulf of Mexico helps to decrease the range between hot and cold temperatures and provides a source of abundant moisture and rainfall.

Temperature

Records of temperatures are available from "Climatological Data" for Louisiana, published by the National Climatic Center. The study area can be described by using the normal temperature data observed at Baton Rouge. This station is shown in Table 3 with the monthly and annual minimum, maximum, and mean normals which are based on the period 1951-1980. The annual mean normal temperature is 67.5°F, with monthly mean temperature normal varying from 82.1°F in July to 50.8°F in January.

A maximum extreme temperature of 110°F was recorded at Baton Rouge during August 1909 and a minimum extreme of 8°F was recorded during December 1989.

TABLE 3

MAXIMUM, MINIMUM, AND MEAN MONTHLY TEMPERATURE (°F)
30 Year Normals (1951-1980)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
MAXIMUM	61.1	64.5	71.6	79.2	85.2	90.6	91.4	90.8	87.4	80.1	70.1	63.8	78.00
MINIMUM	40.5	42.7	49.4	51.5	64.3	70.0	72.8	72.0	68.3	56.3	47.2	42.3	57.00
MEAN	50.8	53.6	60.5	68.4	74.8	80.3	82.1	81.4	77.9	68.2	58.7	53.1	67.50

SOURCE: National Climatic Center

Precipitation

Records of precipitation are also available in publications by the National Climatic Center. Eight stations were used to show the rainfall data for the study area (these stations are shown on Plate C-3 in Appendix C). Table 4 gives a list of stations with their period of record, and available extremes. Baton Rouge Airport is the only station with precipitation normals. The annual normal rainfall for Baton Rouge is 55.8 inches based over the period 1951-1980. Table 5 lists the monthly and annual normals. The wettest month is July with an average monthly normal of 7.07 inches. October is the driest month averaging 2.63 inches. The average annual rainfall since 1980 is 64.85. This average accounts for all eight stations. This ten year average is shown in Table 6 with the monthly and annual averages of each station.

TABLE 4
PRECIPITATION STATIONS

Station	Map No. Plate C-3	Period Of Record (to 1989)	Maximum Monthly (in.)	Date	Minimum Monthly (in.)	Date	Greatest 1-Day (in.)	Date
Baker	1	1980-Date	16.08	4/80	1.10	11/81	6.2	12/4/82
Baton Rouge Airport	2	1869-Date	15.94a	12/82	T	10/78	11.9	4/14/67
Baton Rouge Central	3	1980-Date	19.29	8/83	1.00	11/85	13.5	8/2/83
Baton Rouge Sherwood	4	1979-Date	21.67	8/83	0.44	11/85	14.43	8/2/83
Denham Springs	5	1978-Date	19.24	8/83	T	10/78	13.8	8/2/83
Greenwell Springs	6	1967-Date	17.05	4/80	0.11	6/79	11.42	8/2/83
LSU Ben Hur	7	1963-Date	16.22	2/66	0.0	10/78	8.13	10/4/64
Zachary	8	1975-Date	18.25	10/84	T	10/78	6.58	4/6/83

a From 1951
b And other dates
T Trace

Source: National Climatic Center

Table 5
BATON ROUGE AIRPORT
MONTHLY AND ANNUAL PRECIPITATION (inches)
(1951-1980)

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
4.58	4.96	4.59	5.59	4.82	3.11	7.07	5.05	4.42	2.63	3.95	4.99	55.77

SOURCE: National Climatic Center

Table 6
Average Precipitation (inches)
(1980-1991)

STATION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
Baker	5.65	6.29	4.85	5.12	5.70	6.63	4.23	5.13	5.14	5.17	4.43	6.28	64.82
Baton Rouge Airport	5.04	6.30	4.58	5.16	5.90	6.88	5.78	6.75	4.61	4.52	4.27	5.99	65.78
Baton Rouge Central	5.51	6.31	5.29	5.83	6.06	5.99	5.15	7.30	4.05	4.46	4.98	6.01	66.89
Baton Rouge Sherwood	5.04	6.33	5.49	4.99	5.77	6.43	4.80	7.90	4.37	4.70	4.19	5.24	65.25
Denham Springs	4.85	6.19	5.63	5.14	5.68	6.64	5.73	7.49	3.51	4.69	3.88	5.04	64.90
Greenwell Springs	5.46	6.55	5.67	5.78	6.08	7.00	4.61	6.75	4.41	4.85	4.78	5.90	67.84
LSU Ben Hur	4.88	6.25	4.79	4.44	4.57	7.65	4.64	5.84	4.26	3.99	4.21	5.34	61.68
Zachary	5.02	6.43	5.08	5.32	6.28	6.59	4.62	5.99	4.34	5.34	3.95	6.10	66.93
AVERAGE	5.18	6.33	5.17	5.22	5.76	6.73	4.95	6.64	4.34	4.72	4.34	5.74	65.51

SOURCE: National Climatic Center

Wind

The average velocity of winds in the study area is 7.3 mph. This is based on 19 years of record (1973-1991) taken at Baton Rouge at Ryan Airport. Prevailing wind flow is from a southerly direction during much of the year. The maximum wind speed observed at this station since 1963 was 58 mph during September 1965 and was caused by Hurricane Betsy. Tables 7 and 8, respectively, give the monthly and annual wind speeds for Baton Rouge along with the resultant directions.

TABLE 7
AVERAGE MONTHLY AND ANNUAL WIND SPEEDS
1973-1989 (MPH)
BATON ROUGE AT RYAN AIRPORT

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1973	9.3	9.0	10.2	9.9	9.6	6.1	6.7	5.9	7.5	5.9	8.5	9.8	8.2
1974	8.6	10.0	9.0	10.1	8.8	8.3	6.4	6.3	9.1	7.4	8.8	8.3	8.4
1975	8.4	9.7	11.7	10.2	7.6	6.9	5.3	5.0	6.1	6.5	7.8	7.6	7.7
1976	9.3	9.0	9.7	7.4	7.7	6.2	5.5	5.8	5.7	7.5	7.6	8.2	7.5
1977	9.2	9.3	9.6	7.9	7.2	6.5	4.6	5.8	6.3	6.8	7.9	9.2	7.5
1978	9.9	9.4	8.5	8.4	7.7	6.0	6.1	5.5	5.8	5.0	4.8	7.3	7.0
1979	8.4	8.0	8.8	7.8	6.7	5.9	6.6	3.9	6.4	5.9	6.5	6.0	6.7
1980	7.7	8.4	9.6	7.6	6.1	6.2	4.3	4.4	5.0	5.5	5.3	5.4	6.3
1981	5.6	7.1	7.7	5.8	6.5	5.8	4.7	3.9	5.5	6.9	6.8	7.9	6.2
1982	10.0	8.9	9.1	9.3	6.7	6.8	5.4	5.2	6.4	6.7	7.5	9.2	7.6
1983	7.5	9.2	8.5	9.8	8.2	6.3	5.2	5.3	5.5	5.5	7.6	9.1	7.3
1984	7.4	8.1	8.1	9.4	7.9	6.0	5.3	5.3	7.5	6.5	7.9	8.0	7.3
1985	7.9	8.9	8.7	7.8	6.8	6.5	5.8	6.2	7.0	8.1	7.4	7.1	7.4
1986	7.4	8.7	6.9	7.4	6.9	5.1	5.5	5.3	5.8	5.6	8.1	5.9	6.6
1986	7.6	8.5	7.8	7.3	5.9	6.1	5.4	4.8	5.6	6.9	8.9	8.6	7.0
1988	8.9	8.3	9.1	8.3	7.8	7.0	6.1	5.9	7.1	6.6	8.5	7.3	7.6
1989	8.1	9.7	9.9	8.4	8.2	8.0	7.0	5.7	7.6	7.4	8.1	9.6	N/A
AVG	8.3	8.8	9.0	8.4	7.5	6.4	5.6	5.3	6.4	6.5	7.5	7.9	7.2

Source: U.S. Army Corps of Engineers, New Orleans District

TABLE 8
RESULTANT DIRECTION
1973-1989
BATON ROUGE AT RYAN AIRPORT

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1973	05	01	16	17	19	15	26	07	11	08	15	21	13
1974	11	21	17	14	15	15	25	12	07	09	11	18	13
1975	13	16	14	12	13	15	26	12	03	05	10	05	11
1976	06	20	15	15	23	09	27	01	04	01	01	03	05
1977	01	20	14	15	12	22	23	12	14	05	11	15	13
1978	01	36	30	15	13	09	22	08	07	03	07	11	06
1979	01	06	16	12	14	12	14	18	03	13	02	04	08
1980	05	03	11	04	14	21	24	11	09	02	02	03	07
1981	01	36	03	15	13	17	23	10	05	07	08	05	09
1982	12	02	14	11	14	22	22	20	06	06	09	09	10
1983	02	03	27	17	15	07	07	05	05	05	11	34	05
1984	36	16	16	17	12	15	18	12	03	11	04	10	10
1985	32	03	14	11	22	21	25	08	07	07	11	02	07
1986	01	21	17	16	14	15	22	09	13	11	08	05	14
1987	29	08	03	28	12	11	13	26	01	04	06	11	06
1988	04	01	13	25	17	07	20	05	06	03	15	06	06
1989	08	36	18	13	15	14	22	02	02	05	07	34	N/A

*Wind Direction - Numerals indicate tens of degrees clockwise from true north. 00 indicates calm, 09 east, 18 south, 27 west, 36 north. Resultant direction is the vector sum of wind directions divided by number of observations.

SOURCE: National Climatic Center

Existing Land Use

Existing Land Use

Historical land use for East Baton Rouge Parish in 1954, 1972, 1978, and 1985, are shown in Table 9. A geographic information system (GIS) was used to map historical land use changes. The methodology used is described in detail in Appendix J. Land use in East baton Rouge Parish is largely Urban and built up land, agricultural, and forest lands. In 1985, these land uses made up 95 percent of the land use. Urban and built-up land make up 35 percent of the total land use. Forest and agricultural lands have declined since 1954 from about 94 percent of the total land use to about 60 percent in 1985. This decline is primarily due to the conversion of forest and/or agricultural lands to urban lands. Some forest lands have been converted to agricultural lands. Urban and built-up land have increased from less than 1 percent in 1954 to 35 percent in 1985. The Baton Rouge metropolitan area make up most of the urban land and built-up land.

TABLE 9
EAST BATON ROUGE PARISH
HISTORICAL LAND USE (ACRES)

YEAR	URBAN OR BUILT-UP LAND	AGRICULTURAL LAND	FOREST LAND	WATER	WETLANDS	BARREN
1954	16,183	NA	114,092	NA	NA	139,445*
1972	53,195	126,317	82,702	1,100	5,360	1,046
1978	79,298	92,514	83,343	809	7,013	6,743
1985	92,784	86,580	76,870	1,079	6,473	5,934

* Includes all categories where data was not available.

SOURCE: U.S. Army Corps of Engineers, New Orleans District

Waters, wetlands and barren land have been relatively constant making up about 5 percent of the land use. Parish land use maps are shown in Appendix J. The photo interpretation upon which land use in the Parish are based identifies Cypress tupelo swamps, shrubs, swamps, and other similar types as wetlands. Historical urban development trends within and outside the 100-year floodplain in East Baton Rouge Parish are shown in Tables 10 and 11. Existing urban land use in each watershed under study is listed in Table 12. The greatest increase in urban development within the 100-year floodplain occurred between 1972 and 1978. Growth declined during the 1978-1985 period. This decline in growth can probably be attributable to the general decrease in overall economic growth. Since 1985, economic growth has resumed in the metropolitan area and urbanization is again increasing. In addition, recent floods in the parish have placed more emphasis on the judicious use of the floodplain. The parish in April 1990 passed new ordnances to curtail development in the floodplain. The Ordnances are contained in Appendix K.

TABLE 10
HISTORICAL URBAN DEVELOPMENT TRENDS
WITHIN AND OUTSIDE 100-YEAR FLOODPLAIN
(ACRES)

(1972) PARISH	WITHIN 100-YEAR FLOODPLAIN	OUTSIDE 100-YEAR FLOODPLAIN
East Baton Rouge	8,307	44,888
% Percent	16	84

(1978) PARISH	WITHIN 100-YEAR FLOODPLAIN	OUTSIDE 100-YEAR FLOODPLAIN
East Baton Rouge	18,239	61,059
% Percent	23	77

(1985) PARISH	WITHIN 100-YEAR FLOODPLAIN	OUTSIDE 100-YEAR FLOODPLAIN
East Baton Rouge	22,268	70,516
% Percent	24	76

SOURCE: U.S. Army Corps of Engineers, New Orleans District

TABLE 11

INCREASE IN URBAN DEVELOPMENT WITHIN AND OUTSIDE THE 100-YEAR FLOODPLAIN FOR SELECTED PARISHES

	1972-1978		1978-1985		1972-1985	
PARISH	WITHIN 100-YEAR FLOODPLAIN	OUTSIDE 100-YEAR FLOODPLAIN	WITHIN 100-YEAR FLOODPLAIN	OUTSIDE 100-YEAR FLOODPLAIN	WITHIN 100-YEAR FLOODPLAIN	OUTSIDE 100-YEAR FLOODPLAIN
EAST BATON ROUGE	2.2	1.35	1.22	1.16	2.	1.57

Source: U.S. Army Corps of Engineers, New Orleans District

Biological Resources

The habitats of any of the basins of the area that would be impacted by any flood control measure are open lands and bottomland hardwood forests. The open lands along the channels are not considered to be as significant as are wooded lands in the area. Wooded lands along the channels provide habitat for several species of songbirds, as well as owls, squirrels, rabbits, mink, and others. These wooded lands provide values other than biological for which residents of the urban area indicate a need. Indicators of this include the development of wooded parks in the area, preservation of trees both on residential and commercial areas, preservation of areas of trees and shrubs as property boundaries, etc. The channels themselves also provide habitat in some areas for kingfishers and wading birds. Urban runoff constitutes a very poor source of waters for fish. The channels of the area almost exclusively provide very poor habitat for fish, except for those species that can survive in waters of very low dissolved oxygen. The upper reaches of Blackwater Bayou, and to a lesser extent Beaver Bayou, arise from agricultural and forested areas instead of urban areas and do provide a limited amount of better habitat in some of that area. However, with the receipt of runoff from the lower parts of those streams, aquatic habitat quality becomes very poor again. The inflated heelsplitter is a threatened species that occurs in the Amite River. The endangered bald eagle has nested in an area, not within but adjacent to, the Bayou Fountain area.

TABLE 12

EXISTING URBAN LAND USE BY WATERSHED

WATERSHED	Urban Land Use 1985 (in acres)	Urbanization As Percent of Total Land Use
Blackwater Bayou	2882	31%
Beaver Bayou	2798	35%
Ward Creek	20208	71%
Jones Creek	12963	77%
Bayou Fountain	6420	25%
Claycut Bayou	4932	51%
Bayou Manchac	2625	35%

Source: U.S. Army Corps of Engineers, New Orleans District

Cultural Resources

There are 51 properties currently listed on the National Register of Historic Places in East Baton Rouge Parish. Numerous archeological sites and historic structures also have been recorded throughout East Baton Rouge Parish (see Cultural Resources Correspondence Appendix G).

The culture history of the study area has been influenced by its geographic features, principally Pleistocene terraces, and proximity to the Mississippi River. Evidence of past human occupation and utilization of the study area is expected from Paleo-Indian times to the present. Adaptive strategies employed by the prehistoric inhabitants who occupied the area have resulted in a variety of site types which are identified within the study area; examples of these sites include campsites, extraction sites or procurement stations, ceremonial or village sites, and agricultural sites. Historic settlement initially occurred slowly in the study area. This trend continued into the American Period when the area became increasingly more settled and individual farmsteads were

replaced by small communities. Economic and industrial developments which occurred in the study area have resulted in an increased range of historic site types located within the study area.

Recreation Resources

East Baton Rouge Parish has an aggressive recreation program providing recreational sites and programs for urban and rural areas alike. Existing recreational areas in East Baton Rouge Parish include numerous local parks, neighborhood playgrounds, country clubs, a zoo, state commemorative areas, etc. The Recreation and Parks Commission for the Parish of East Baton Rouge (BREC) in their most recent reporting year (1992), reports 136 BREC facilities on a total of 3,840 acres. Attendance at these sites is estimated at 8,309,801 annually. Many programs were expanded and new programs were added by BREC. Improvements include an Art Gallery at City Park, 15 new centers, 26 new day camps, the Velodrome bike facility, a horse activity center, the fairgrounds, Highland Road tennis center, and many others. Golf courses within the BREC System registered 200,000 rounds of golf played in 1992. The Greater Baton Rouge zoo experienced a total of 345,193 visitors as it observed its 20th anniversary. All of the 132 tennis courts were highly utilized with annual tournaments being held at most of the tennis centers. Other popular activities offered at BREC facilities include women's co-ed sports, basketball, baseball, football, and fun runs. BREC parks are generally located in neighborhoods within walking or biking distance from most of the potential users. These parks are equidistant from each other providing the opportunity for high neighborhood utilization. Few formal bicycle riding trails exist within the parish. Approximately 4.5 miles of Class I bikeways and 5.2 miles, Class II, bikeways are present in East Baton Rouge Parish. Class I bikeways are bikeways which have a separate path for the exclusive use of bicycles. Class II bikeways generally consist of a shoulder of a roadway designated for the preferential or exclusive use of bicycles.

Aesthetics

Within East Baton Rouge Parish, vegetation existing along the various drainage corridors provides a variety of aesthetic and ecological benefits. Erosion control, wildlife benefits, improvement of air quality, and providing a scenic buffer zone are positive attributes attributable to these vegetative linear green spaces. Vegetation existing along the stream banks also contributes to erosion control. The natural vegetative growth of horizontal root systems limits bank erosion and contributes to stable banks. The existing stream bank vegetation provides wildlife and bird habitats. In a world of concrete, gas fumes, industrial corridors, and shopping centers, the concept of encountering groups of wildlife and flocks of birds is quite unique for a city. These green stream bank corridors provide an opportunity to harbor wildlife and provide tree nesting areas for native fauna. These stream corridors increase the abundance and diversity of wildlife in the city contributing to an overall aesthetic neighborhood experience.

Another advantage of greenway corridors in the city is the reduction in pollution, creation of shade, and stimulating air movements. In summer vegetative stream bank areas can be as much as ten degrees cooler under tree cover. Air currents moving through the city over these forested areas would result in cooler air and lower humidity. By preserving these natural areas where trees and native shrubs are allowed to flourish, adjacent aesthetic conditions are maintained. These greenways along stream banks provide a buffer zone decreasing the nuisance of lights, noise, visual unsightliness, etc., from the view of adjacent residents. Throughout the city, the greenway screens non-compatible use from aesthetic degradation by providing a spacial separation between different use areas within the city and strengthens neighborhood identities.

Surface Water

The major rivers in the study area are the Amite River and the Comite River. The Amite River is used for recreation, propagation of fish and wildlife, and to a lesser extent, for water supply, navigation, and waste disposal. The Amite River has a drainage area of about 2,200 square miles and an average flow of about 2,000 cubic feet per second (cfs) at Denham

Springs. The Comite River has a drainage area of 334 square miles and an average flow of 457 cfs near Comite, Louisiana.

Groundwater

Fresh groundwater in the study area is obtained from the Pliocene, Miocene, and Quaternary Age deposits as well as undifferentiated aquifers that occur in alluvial coastal and upland deposits. Deposits of Pliocene age consist of medium to very fine grained sand beds alternating with silt and clay beds. These sediments thicken and dip steeply toward the Gulf of Mexico, reaching a thickness of about 2,200 feet near the southern limit of freshwater availability. Miocene age deposits consist mostly of lenticular deposits of fine- to medium-grained sand and beds of silt and clay. In some areas, very coarse sand and gravel are present. Individual sands may be as thick as 150 feet. These deposits are wedge-shaped and thicken greatly as they extend toward the Gulf of Mexico.

Quaternary deposits cover Miocene and Pliocene aquifers in nearly all of the study area. The Quaternary deposits range in thickness from less than 50 feet in the north to more than 3,500 feet near the coast. The maximum depth at which these deposits contain freshwater is about 1,000 feet.

Water Supply

Historical and existing water use in East Baton Rouge Parish and the entire Amite River Basin are shown in Table 13. Public water is entirely supplied by groundwater sources. Industrial water use is significantly higher than public use. In 1960, industrial water was mainly supplied from surface sources, i.e., the Mississippi River. Until very recently, there has been an increased use of groundwater usage by industry in the parish. This contributed to significant drawdowns in some of the parish's main supply aquifers. Through several groundwater management programs, this trend has been reversed with several large users converting to surface supply. The above mentioned aquifer drawdowns have also recovered and are closely monitored.

TABLE 13

HISTORICAL AND EXISTING WATER USE IN EAST BATON ROUGE PARISH
(million gallons per day)

	PUBLIC SUPPLY		INDUSTRIAL		POWER GENERATION		RURAL DOM.	LIVE STOCK		RICE		OTHER IRRIG.		AQUACULTURE		TOTAL		
YEAR	GROUND	SURFACE	GROUND	SURFACE	GROUND	SURFACE	GROUND	GROUND	SURFACE	GROUND	SURFACE	GROUND	SURFACE	GROUND	SURFACE	GROUND	SURFACE	TOTAL
1960	19.20	0.00	67.73	366.62	7.52	7.56	1.45	0.02	0.48	0.00	0.00	0.00	0.00	0.00	0.00	95.92	374.66	470.58
1965	26.93	0.00	59.99	339.96	7.32	5.76	0.94	0.13	0.29	0.00	0.00	0.00	0.00	0.00	0.00	95.31	346.01	441.32
1970	32.40	0.00	99.59	361.53	7.48	7.63	0.35	0.28	0.38	0.00	0.00	0.35	0.05	0.00	0.00	140.45	369.59	510.04
1975	39.90	0.00	84.70	114.00	7.14	5.29	0.31	0.14	0.14	0.00	0.00	0.19	0.11	0.00	0.00	132.38	119.54	251.92
1980	53.90	0.00	86.50	69.00	7.07	4.03	1.73	0.14	0.02	0.00	0.00	0.14	0.00	0.06	0.00	149.54	73.05	222.59

Source: Louisiana Department of Transportation and Development

Water Quality

Water quality data on the stream segments in East Baton Rouge Parish under investigation for this study were either out-dated or non-existent. Therefore, water and sediment samples were collected by the New Orleans District U.S. Army Corps of Engineers on October 26, 1989. Thus, these samples are indicative of moderate air temperatures, dry weather, and low-flow conditions. See Appendix C for further details. Data for the Comite and Amite Rivers were compiled from the Environmental Protection Agency's computerized Storage and Retrieval Database (STORET) files.

Comite River

The Comite River, from Louisiana Highway 10 to White Bayou, has been designated a Louisiana Natural and Scenic stream by the Louisiana Department of Environmental Quality (LDEQ). The Comite River is categorized as an effluent limited stream; which is, by definition, any stream segment in which the best practicable treatment levels for point source discharges are required to maintain the stream's standards.

Of the parameters analyzed for the Comite River only pH values violated the state standards. The state standards indicate that pH should generally fall within the range of 6.0 to 8.5. Low pH values were observed in the Comite River near Olive Branch, Louisiana, and Comite, Louisiana. Near Olive Branch, Louisiana, only one pH value (6% of the total pH values) was below the minimum 6.0 (standard units) SU state standard. Two pH values or about 5% of the total pH observations near Comite, Louisiana, were below the state standard.

Though no DO concentrations are available at these three sampling locations on the Comite River, the Louisiana Department of Wildlife and Fisheries (LDWF) collected water quality samples on the lower Comite River in October 1973 and again in May 1980. The LDWF collected a total of six samples and reported that the DO levels were consistently between 7 and 9 mg/l. These values are well above the minimum 5.0 mg/l state standard. It should be noted that the above samples were collected at times of low flow conditions. Generally, lower DO

values along a stream segment are found during low flow and warm weather conditions. Samples taken on Comite River tributaries on the same dates yield mean DO levels between 1.7 and 9.3 mg/l with 0.0 mg/l reported for one measurement on North Branch of Hurricane Creek. The EPA standard of 100 mg/l was violated for both of the two observation of total phosphorus along the Comite River.

Though no fecal coliform data was collected at the three stations on the Comite River, the LDWF collected water quality samples on the lower Comite River in October 1973 and May 1980. The LDWF collected a total of 6 samples and reported averages of 330 fecal coliform colonies/100 ml. This is in excess of the maximum 200/100 ml state standard. These violations are the result of the numerous package treatment plants that treat municipal waste from subdivisions along the Comite River and tributary streams. Samples taken on the same dates on Comite River tributaries yielded average fecal coliform counts of 7,000; 6,000; 22,000; 170,000; 500; and 8,000 colonies/100 ml.

The water conditions described in the above paragraphs are based on low flow conditions. The characterization is based upon limited data. At low flow conditions, water quality is likely low in dissolved oxygen (DO) and high on coliform bacteria. Recent water quality data collected for input into a water quality model is summarized below:

Date	Stream	Dissolved Oxygen (mg/l)	Coliform (Colonies/100ml)	Total Phosphorus (mg/l)	pH
9/10/90	Comite River	6.1	680	0.02	6.6
9/10/90	White Bayou	2.5	320	0.1	6.7
10/9/90	Comite River	6.2	106	0.16	6.1
10/9/90	White Bayou	3.7	96	0.12	6.5
4/1/91	Comite River	9.4	54	0.11	5.9
4/1/91	White Bayou	7.2	118	0.26	6.1
5/8/91	Comite River	5.2	2960	0.45	5.5
5/8/91	White Bayou	4.2	3160	0.34	5.5

In general, the water quality of the Comite River and Tributaries streams in the area during average flow conditions can be characterized as generally good.

Amite River

The Amite River, from the Louisiana-Mississippi state line to LA Highway 37 is designated a Louisiana Natural and Scenic stream. The Amite River is also an effluent limited stream segment. Standards for pH and total dissolved solids (TDS) were exceeded at all five sampling locations.

The station near Darlington, Louisiana, at Highway 10 had the greatest percentage of violations with respect to pH values, with 19% of the values below the pH standard of 6.0 SU. The minimum pH value recorded at this site was 5.2 SU. The station located near Magnolia had the lowest pH value which was 4.9 SU. However, only 6% of the total pH values measured at the Magnolia location were in violation of the state standard. Low pH values are of concern since many pollutants are known to become more toxic as pH becomes lower. It is interesting that, like the Comite River, the pH levels in the Amite River increase at the downstream locations. Since the northern portions of the river basins are mostly forested and agricultural lands, perhaps these lower pH values are the result of agricultural and silviocultural practices.

Although the state standard for total dissolved solids (TDS) was violated at all five locations, the maximum percent exceedance was 7% at the farthest downstream location near the Highway 42 Bridge. Except for this location, the mean TDS concentrations for the other sampling locations is about 54 mg/l; well below the maximum 150 mg/l state standard.

For the three station locations on the upper Amite River, there were no DO violations. The mean DO concentrations at these stations were about 8.3 mg/l. The station at the 4H Camp near Denham Springs had one DO violation in 131 observations. However, about 22% of the DO concentration observed at the Highway 42 bridge violated the minimum 5.0 mg/l state standard. The mean violation was about 4.1 mg/l with the violations equally distributed throughout the months of May through

October. Severe oxygen depletion has been reported in the Amite River below the Amite River Diversion Canal.

The mean chloride and sulfate concentrations are well within the state standards. The percent exceedance values are generally rare and much less than 5%. The furthest downstream location is the exception with a percent exceedance value of 6%. The exceedances at this downstream location are probably due to the influence of brackish water from Lakes Pontchartrain and Maurepas.

The LDEQ has set guidelines for maximum turbidity levels in the Amite River at 50 nephelometric turbidity unites (NTU). For the reach of the Amite River designated as scenic, the guideline is 25 NTU. Although, the mean turbidity levels measured at all of the stations are within these guidelines, there is about a 20 - 25% exceedance value at each of the stations. These high turbidity levels are the result of early storm runoff and sand and gravel mining operations in the Amite River. In the Amite River, 73% of the total phosphorus values exceeded th 50 mg/l EPA standard.

Generally, the quality of water, with regard to fecal coliforms, decreases as one progresses downstream. The log means range from 153 colonies/100 ml at the Grangeville Bridge location to 884 colonies/100ml at the Highway 42 Bridge location. The 90th percentile values for all five locations are well above the 400 colonies/100 ml state standard. These fecal coliform violations can be attributed to stormwater runoff and domestic wastewater discharges from Baton Rouge that enter the Amite River directly or via other tributaries.

There are consistent exceedances of the acute criteria for cadmium, copper, and lead. The acute criteria for mercury is exceeded only at the downstream location at the Highway 42 bridge. Mercury is of concern because of bioaccumulated effects. Zinc and nickel data were collected only at the 4H Camp location near Denham Springs, Louisiana, which has an exceedance ration of 69 percent for zinc and no exceedances for nickel.

As expected, the chronic exceedances at the five locations equalled or exceeded the acute criteria exceedances. Of

particular significance are the much higher exceedance ratios for the trace metal mercury.

Streamflow Data

Streamflow data is available from major gaging stations in the study area. Many of these stations are maintained through cooperative agreement between the U.S. Army Corps of Engineers and the U.S. Geological Survey. Maximum records were set at 7 of the 12 stations in the study area from the April 1983 flood. The stations with their maximum and minimum stages and discharges are shown in Table 14.

TABLE 14
STREAMFLOW DATA

MAP NO.	STATION	PERIOD OF RECORD	MAXIMUM STAGE FT (NGVD)	MAXIMUM DATE	MAXIMUM DISCHARGE CFS	MAXIMUM DATE	MINIMUM STAGE FT (NGVD)	MINIMUM DATE	MINIMUM DISCHARGE CFS
1	AMITE RIVER PORT VINCENT	1954-89 1984-90	14.59	4/83	69500	1/90	-1.60	12/54	85
2	AMITE RIVER NEAR DENHAM SPRINGS	1938-89	41.50	4/83	112000	4/83	8.43	11/38	271
3	COMITE RIVER NEAR COMITE DATUM 23.85 FT	1944-90	54.49	5/53	37000	4/83	-	-	28
4	COMITE RIVER GREENWELL SPRINGS	1962-90	49.42	4/83	-	-	-	-	-
5	COMITE RIVER NEAR BAKER	1965-89	73.34	6/67	-	-	-	-	-
6	WHITE BAYOU SE ZACHARY DATUM 65.0 FT	1965-90	88.24	4/83	4730	4/83	2.66	11/86	0
7	WHITE BAYOU NEAR BATON ROUGE DATUM 62.0 FT	1965-90	81.08	4/77	1660	4/83	3.06	11/82	0
8	ALLIGATOR BAYOU SPANISH LAKE FLOODGATE UPPER	1955-73 1974-89	10.66	4/80	-	-	-0.40	7/64	-
9	ALLIGATOR BAYOU SPANISH LAKE FLOODGATE LOWER	1955-89	15.71	4/83	-	-	-2.42	4/80	-
10	BAYOU MANCHAC HOPE VILLA	1945-88 1960-89	15.60	4/83	-	-	-1.63	12/54	-
11	BAYOU MANCHAC NEAR PORT VINCENT	1972-88	18.85	4/83	-	-	-	-	-
12	MISSISSIPPI RIVER BATON ROUGE	1872-88 1931-45 1947-56	47.28	5/27	1473000	-	-0.07	11/94	73700

Source: U.S. Army Corps of Engineers, New Orleans District

Description of Flood Problems

Major Floods

Most streams in the Parish are subjected to backwater flooding along the lower reaches in the vicinity of the streams confluences with Comite River, Bayou Manchac, and Amite River. The upper reaches of these streams are subjected to headwater flooding. Headwater flooding is caused by high-intensity usually short duration rainfall that produces high flood elevations with very little warning. Flood occurrence within specific watersheds are shown in Table 15.

Major floods events that have affected most of the watershed in the East Baton Rouge Parish are described in subsequent paragraphs.

1953 Flood. The flood of May 1953 was caused by unusually heavy rains beginning on 27 April. During the period 22 April-9 May 1953 heavy rainfall produced generally high stages on most streams in the area and created favorable conditions for additional flooding following a second storm period between 10-21 May 1953. During the second storm period rainfall in the area ranged from 17.5 inches at New Roads to 7.0 inches at Baton Rouge. The average rainfall for the total storm period 22 April-21 May over the area was about 18 inches. Amite River near Denham Springs had a maximum stage of 36.37 ft. NGVD for this flood.

1962 Flood. The flood of April 1962 was caused by unusually heavy rains during the period 27-28 April 1962. Rainfall ranged from 4.0 inches at New Roads to 7.0 inches at Baton Rouge. The flood overflowed an area in excess of 114,000 acres along several streams in the basin.

1973 Flood. Headwater flooding occurred throughout the study area during the spring of 1973. During the period 23-25 March 1973, 7.3 and 7.7 inches of rainfall were recorded at Baton Rouge, and Greenwell Springs, respectively. Many streams overflowed their banks flooding adjoining areas.

TABLE 15
FLOOD OCCURRENCE WITHIN SPECIFIC WATERSHEDS

Watershed	Flood Events	
Bayou Fountain & Tributaries	April 1942 November 1947 May 1953 April 1962 March 1964 April 1967 April 1969	March 1973 April 1977 April 1979 April 1983 August 1987 June 1989 February 1992 January 1993
Monte Sano Bayou	1962 March 1973 April 1975	April 1979 April 1980
Claycut Bayou	April 1967 April 1969 March 1970 October 1970 December 1972 March 1973 April 1975	April 1977 May 1978 April 1979 April 1980 April 1983 August 1987 June 1989 January 1990 January 1993
Jones Creek & Tributaries	March 1947 September 1957 April 1962 October 1964 September 1965 February 1966 April 1967 March 1970 May 1972 March 1973	April 1975 May 1976 September 1977 April 1977 April 1979 April 1983 August 1983 August 1987 June 1989 January 1990 January 1993
Ward Creek & Tributaries	March 1947 May 1953 May 1954 April 1955 September 1957 January 1958 April 1962 October 1964 April 1967 April 1969	March 1973 May 1976 April 1977 May 1978 April 1979 April 1983 October 1991 June 1992 June 1989 January 1993
Bayou Manchac	April 1967 March 1973 April 1975 April 1977	April 1979 April 1983 January 1990
Blackwater Bayou & Tributaries	April 1962 October 1964 April 1967 March 1973	April 1975 April 1977 April 1983
Beaver Bayou & Tributaries	April 1967 September 1973 April 1977	April 1980 April 1983 January 1990

Source: U.S. Army Corps of Engineers, New Orleans District

1977 Flood. Record flooding occurred in the Amite River Basin during the period 20-26 April. Rainfall amounts over this period ranged up to 15 inches with many reports of 6-13 inches. From 4-8 feet of flooding occurred along the Comite River with the maximum stage of 51.37 feet NGVD at Comite gage exceeding the 1973 record by 5.94 feet. Up to 12 feet of flooding occurred along the Amite River where the 41.08 feet NGVD, maximum stage at Denham Springs exceeded 1973's record by 4.6 feet. A new record occurred upstream at Darlington on the Amite River where the gage height peaked at 21.76.

1979 Flood. The 1979 flood was caused by headwater flooding on the Amite River and Tributaries and inadequate drainage facilities in the study area. High stages occurring along the Amite and New Rivers produced substantial flooding in and around Baker, Baton Rouge, Denham Springs, French Settlement, Gonzales, Port Vincent, Sorrento and Zachary. Maximum stage at Denham Springs was 36.36 feet NGVD.

1983 Floods. Heavy rains produced floods in April and August of 1983. During 5-8 April, severe thunder storms produced more than 10 inches of rain over the study area. Amite received nearly 9 inches on 6 April. Maximum stage records were exceeded at 9 gages. The record at Denham Springs was 41.5 feet NGVD which exceeded the 1977 flood record of 41.08 feet NGVD. Flash flooding occurred on 2 August in portions of the Baton Rouge and Vicinity when a weak tropical wave moved slowly over the area producing 24-hour rainfall amounts of 12-15 inches. Baton Rouge Sherwood (Woodlawn) and Denham Springs received 14.43 inches and 13.8 inches, respectively.

1989 Flood. Heavy rain from Tropical Storm Allison accounted for this flood. Seven to ten inches of rain fell in a twelve hour period over east-central Louisiana during 27-28 June. Baton Rouge recorded a 24-hour rainfall total of 9.7 inches. Stages of Bayou Fountain were nearly two feet higher than those set in the 1983 flood.

1990 Flood. A cold front passage on 24-25 January, and the squall line ahead of the front, generated heavy rains and

localized flooding over the study area. The most extensive flooding occurred to the east of Baton Rouge. Flooding was reported on the Amite and Comite Rivers. The two-day storm rainfall ranged from 4-6 inches. Antecedent conditions, with saturated soils and elevated water tables, intensified flooding problems. Stages approached those of the 1983 flood.

1993 Flood. Similar to the 1990 flood, a heavy squall line ahead of a slow moving cold front on 22-23 January produced heavy, prolonged rains ranging from 7-8 inches in the south and east to 13-14 inches in the northwest part of the parish. Significant flooding occurred in the Comite River and its tributaries in and around Baker. Some moderate flooding occurred along the Amite River. Significant headwater and some backwater flooding occurred in the Bayou Fountain watershed, particularly, in the Siegen to Gardere Lane developments.

Flood Damage

Flood problems in northern and northeastern portion of the parish are due to headwater overflows from the Comite River, Cypress Bayou, White Bayou, Sandy Creek, Beaver Bayou, South Canal, Baker Canal, Monte Sano Bayou, and tributaries of these streams. Overflow from backwater flooding creates problems along Hurricane Creek, lower Comite River, and lower reaches of its tributaries streams. Flood problems in the southern and southeastern portion of the parish are caused by headwater overflow from Ward Creek and Tributaries, the Amite River, Clay Cut Bayou, Jones Creek and tributaries, and Bayou Fountain and tributaries. Backwater flooding occurs along lower Ward Creek from Bayou Manchac and the Amite River. The area along lower Clay Cut Bayou, Honey Cut Bayou, and Jones Creek from the Amite River. Backwater flooding occurs in the lower reaches of Bayou Fountain from Bayou Manchac and the Amite River. Comprehensive damage data are not available for most of the past flood events. Each flood event, along with all available damage data, are described below.

During the April 1977 flood, about 25,000 acres of land were inundated in the Baton Rouge area. A total of 1,500 urban residences and some of the business establishments were flooded. Inundated structures were flooded in depth over the floor from a few inches to about eight feet. Inundated

structures were flooded from a few hours to several days. Damages to structures and contents were estimated at about \$20.7 million. Total damages in the parish were \$24.0 million. Limited flooding occurred in April 1979, causing an estimated \$1.4 million in damages to the Baton Rouge area.

East Baton Rouge Parish was severely flooded in 1983 along the Amite and Comite Rivers, Clay Cut Bayou, Cypress Bayou, Beaver Bayou, Sandy Creek and White Bayou. Amount 55,000 acres of land was flooded, and a total of 1558 urban residences, 20 rural residences, and 37 urban business establishments were damaged. Flood damages were estimated at \$65.2 million. About 75 percent of the damages occurred along the Comite River and tributary streams. Flooding up to eight feet above the first floor was reported with inundation of structures lasting from a few hours to several days. Some streets and yards were reported flooded for a longer period of time. Agricultural flooding occurred; however, much of the land was fallow at the time of the flood. About 10,000 acres of improved pasture flooded. The pasture was damaged, but the water did not stay long enough to kill the grass. Approximately 30 tons of hay were reported lost.

Flood Damage Potential

East Baton Rouge Parish was subdivided into 7 hydrologic subbasins. Subbasin locations are shown on Plate 4. Plates 5-10 illustrate each subbasin and its 10- or 25-year frequency floodplain. The hydrologic and hydraulic analysis, land use, and the economic analysis were conducted on a subbasin level. This allowed damage centers to be more clearly identified as well as the cause of flooding. The flood damage potential was evaluated for each subbasin. This potential shows an indication of the level of flood protection that can be economically justified. Table 16 shows the number of structures located in various floodplains by subbasin. The existing average annual damage by subbasin is also shown.

Streambank Erosion

In several watersheds in the parish, streambank erosion is a significant problem. The problem is severe in several locations where residential and commercial improvements border the streambank. Fences, backyards, and in some instances, structures have been or are currently being affected by the on-going bank sloughing (See photos, Figure 1). Significant property losses caused by erosion problems are widespread throughout most of the Jones Creek watershed and on the North Branch Tributary of Ward Creek.

TABLE 16

NUMBER OF STRUCTURES IN THE VARIOUS FLOODPLAINS OF EAST BATON ROUGE

BASIN NO.	STRUCTURE CATEGORY	0-10 YEAR	10-25 YEAR	25-50 YEAR	50-100 YEAR	100-500 YEAR	ABOVE 500 YEAR	ALL FLOOD ZONES
	BLACKWATER BAYOU WATERSHED - TOTAL EQUIVALENT ANNUAL FLOOD DAMAGES - $5,581,000							
	BASIN NAME: BLACKWATER BAYOU							
13	1-STORY	198	72	332	182	62	110	956
	2-STORY	24	3	9	7	2	5	50
	MOBILE HOME	4	5	21	9	21	101	161
	COMMERCIAL	10	5	18	10	4	9	56
	TOTAL	236	85	380	208	89	225	1,223
	BEAVER BAYOU WATERSHED - TOTAL EQUIVALENT ANNUAL FLOOD DAMAGES - $10,407,000							
	BASIN NAME: BEAVER BAYOU							
14	1-STORY	315	72	39	112	69	640	1,247
	2-STORY	14	2	1	4	4	28	53
	MOBILE HOME	9	19	8	9	12	195	252
	COMMERCIAL	95	8	2	7	2	133	247
	TOTAL	433	101	50	132	87	996	1,799

TABLE 16 (Continued)

NUMBER OF STRUCTURES IN THE VARIOUS
FLOODPLAINS OF EAST BATON ROUGE

BASIN NO.	STRUCTURE CATEGORY	0-10 YEAR	10-25 YEAR	25-50 YEAR	50-100 YEAR	100-500 YEAR	ABOVE 500 YEAR	ALL FLOOD ZONES
	WARD CREEK WATERSHED - TOTAL EQUIVALENT ANNUAL FLOOD DAMAGES - $4,074,000							
	BASIN NAME: WARD CREEK							
21	1-STORY	14	59	56	182	456	1,275	2,042
	2-STORY	1	0	5	2	3	25	38
	MOBILE HOME	0	0	0	0	1	0	1
	COMMERCIAL	3	13	17	48	91	220	392
	TOTAL	18	72	78	232	551	1,520	2,471
	BASIN NAME: BAYOU DUPLANTIER							
25	1-STORY	3	13	1	22	9	65	113
	2-STORY	2	6	6	6	6	15	41
	MOBILE HOME	0	0	0	0	0	0	0
	COMMERCIAL	12	2	2	4	13	13	46
	TOTAL	17	21	9	32	28	93	200

TABLE 16 (Continued)

NUMBER OF STRUCTURES IN THE VARIOUS FLOODPLAINS OF EAST BATON ROUGE

BASIN NO.	STRUCTURE CATEGORY	0-10 YEAR	10-25 YEAR	25-50 YEAR	50-100 YEAR	100-500 YEAR	ABOVE 500 YEAR	ALL FLOOD ZONES
	WARD CREEK WATERSHED (CONTINUED)							
	BASIN NAME: DAWSON CREEK							
26	1-STORY	51	50	20	14	24	72	231
	2-STORY	10	5	3	1	1	9	29
	MOBILE HOME	0	0	0	0	0	0	0
	COMMERCIAL	52	50	11	17	15	64	209
	TOTAL	113	105	34	32	40	145	469
	BASIN NAME: NORTH BRANCH - WARD CREEK							
27	1-STORY	17	84	41	161	167	366	836
	2-STORY	3	18	1	21	61	45	149
	MOBILE HOME	0	0	0	0	0	0	0
	COMMERCIAL	23	16	14	9	19	233	314
	TOTAL	43	118	56	191	247	644	1,299

TABLE 16 (Continued)

NUMBER OF STRUCTURES IN THE VARIOUS FLOODPLAINS OF EAST BATON ROUGE

BASIN NO.	STRUCTURE CATEGORY	0-10 YEAR	10-25 YEAR	25-50 YEAR	50-100 YEAR	100-500 YEAR	ABOVE 500 YEAR	ALL FLOOD ZONES
	WARD CREEK WATERSHED (CONTINUED)							
	BASIN NAME: DAWSON CREEK							
30	1-STORY	20	69	17	8	119	54	287
	2-STORY	0	2	2	10	18	19	51
	MOBILE HOME	0	0	0	0	0	0	0
	COMMERCIAL	19	20	3	5	12	82	141
	TOTAL	39	91	22	23	149	155	479
	BASIN NAME: WARD CREEK							
32	1-STORY	17	5	49	29	82	155	337
	2-STORY	3	2	3	2	2	15	27
	MOBILE HOME	4	0	0	0	1	71	76
	COMMERCIAL	25	4	19	15	2	13	78
	TOTAL	49	11	71	46	87	254	518

TABLE 16 (Continued)

NUMBER OF STRUCTURES IN THE VARIOUS FLOODPLAINS OF EAST BATON ROUGE

BASIN NO.	STRUCTURE CATEGORY	0-10 YEAR	10-25 YEAR	25-50 YEAR	50-100 YEAR	100-500 YEAR	ABOVE 500 YEAR	ALL FLOOD ZONES
	JONES CREEK WATERSHED - TOTAL EQUIVALENT ANNUAL FLOOD DAMAGES - $8,049,000							
	BASIN NAME: JONES CREEK							
22	1-STORY	57	28	123	92	141	1,062	1,503
	2-STORY	7	6	24	16	36	212	301
	MOBILE HOME	1	1	2	0	1	4	9
	COMMERCIAL	50	29	51	30	35	185	380
	TOTAL	115	64	200	138	213	1,463	2,193
	BASIN NAME: LIVELY BAYOU TRIBUTARY							
23	1-STORY	505	126	114	44	60	69	918
	2-STORY	20	10	4	3	5	13	55
	MOBILE HOME	0	0	0	0	0	0	0
	COMMERCIAL	2	1	0	0	0	0	3
	TOTAL	527	137	118	47	65	82	976

TABLE 16 (Continued)

NUMBER OF STRUCTURES IN THE VARIOUS FLOODPLAINS OF EAST BATON ROUGE

BASIN NO.	STRUCTURE CATEGORY	0-10 YEAR	10-25 YEAR	25-50 YEAR	50-100 YEAR	100-500 YEAR	ABOVE 500 YEAR	ALL FLOOD ZONES
	JONES CREEK WATERSHED (CONTINUED)							
	BASIN NAME: LIVELY BAYOU							
24	1-STORY	116	55	64	24	78	101	438
	2-STORY	10	58	5	0	8	18	99
	MOBILE HOME	0	0	1	0	11	25	37
	COMMERCIAL	31	10	19	2	9	3	74
	TOTAL	157	123	89	26	106	147	648
	BASIN NAME: WEINER CREEK							
28	1-STORY	8	0	13	0	45	229	295
	2-STORY	0	0	0	2	4	36	42
	MOBILE HOME	0	0	0	0	0	1	1
	COMMERCIAL	0	0	1	0	0	21	22
	TOTAL	8	0	14	2	49	287	360

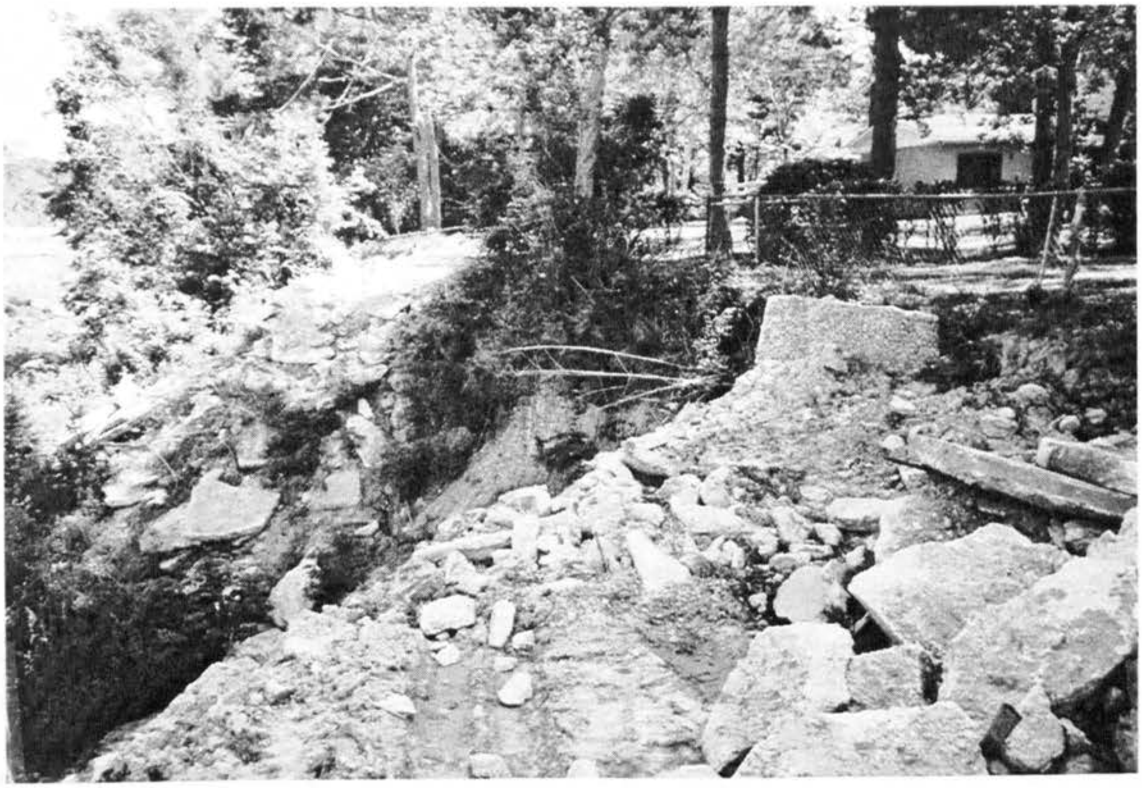
TABLE 16 (Continued)

NUMBER OF STRUCTURES IN THE VARIOUS FLOODPLAINS OF EAST BATON ROUGE

BASIN NO.	STRUCTURE CATEGORY	0-10 YEAR	10-25 YEAR	25-50 YEAR	50-100 YEAR	100-500 YEAR	ABOVE 500 YEAR	ALL FLOOD ZONES
	BAYOU FOUNTAIN WATERSHED - TOTAL EQUIVALENT ANNUAL DAMAGES - $1,655,000							
	BASIN NAME: BAYOU FOUNTAIN							
29	1-STORY	41	130	26	33	531	432	1,193
	2-STORY	7	50	113	5	196	133	504
	MOBILE HOME	0	0	0	0	0	6	6
	APT.BLDGS.	39	125	101	10	54	39	368
	COMMERCIAL	8	22	11	45	112	82	280
	TOTAL	95	327	251	93	893	692	2,351

SOURCE: U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTICT

FIGURE 1



NORTH BRANCH WARD CREEK-BANK FAILURE AND ATTEMPTED RIP-RAP REPAIR

NORTH BRANCH WARD CREEK-BANK FAILURE AND ATTEMPTED RIP-RAP AND FILL REPAIR

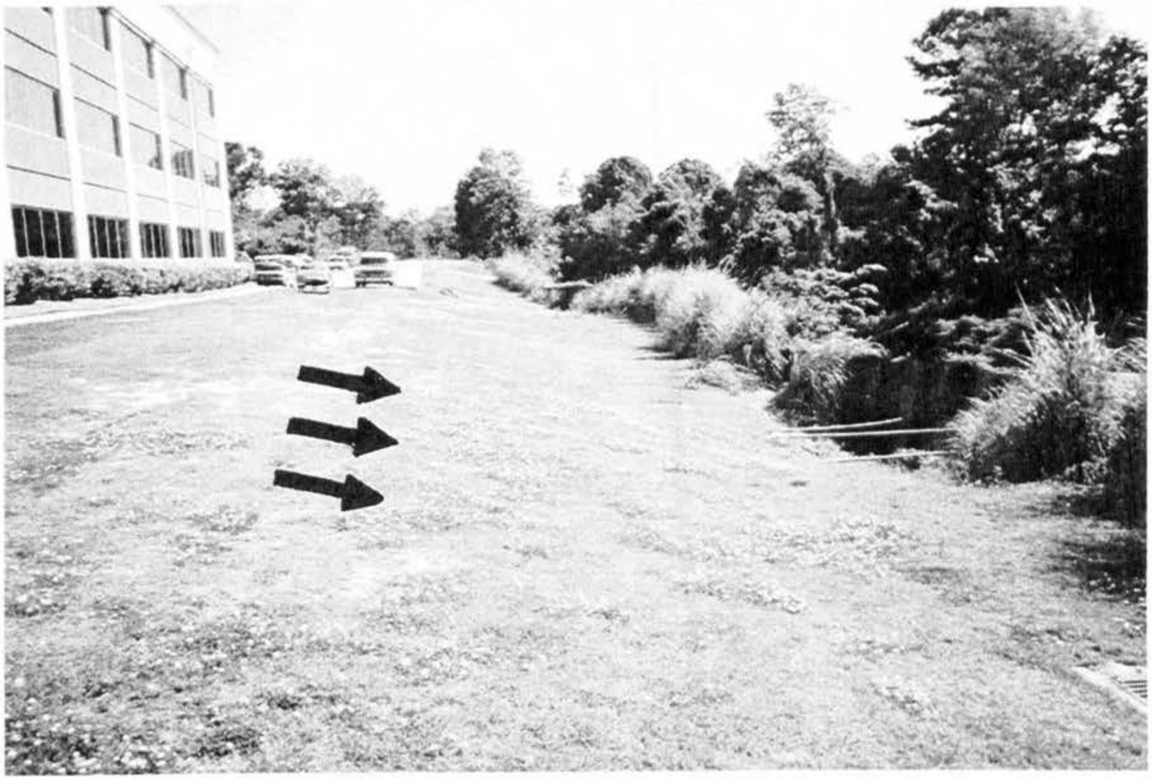
FIGURE 1 (CON'T)

NORTH BRANCH WARD CREEK-BANK FAILURE AND ATTEMPTED RIP-RAP AND FILL REPAIR

NORTH BRANCH WARD CREEK-BANK FAILURE AND ATTEMPTED RIP-RAP AND FILL REPAIR; NOTE NEW FAULT CLOSER TO STRUCTURE

FIGURE 1 (CON'T)

NORTH BRANCH WARD CREEK-BANK FAILURE AND ATTEMPTED SHEETPILE REPAIR



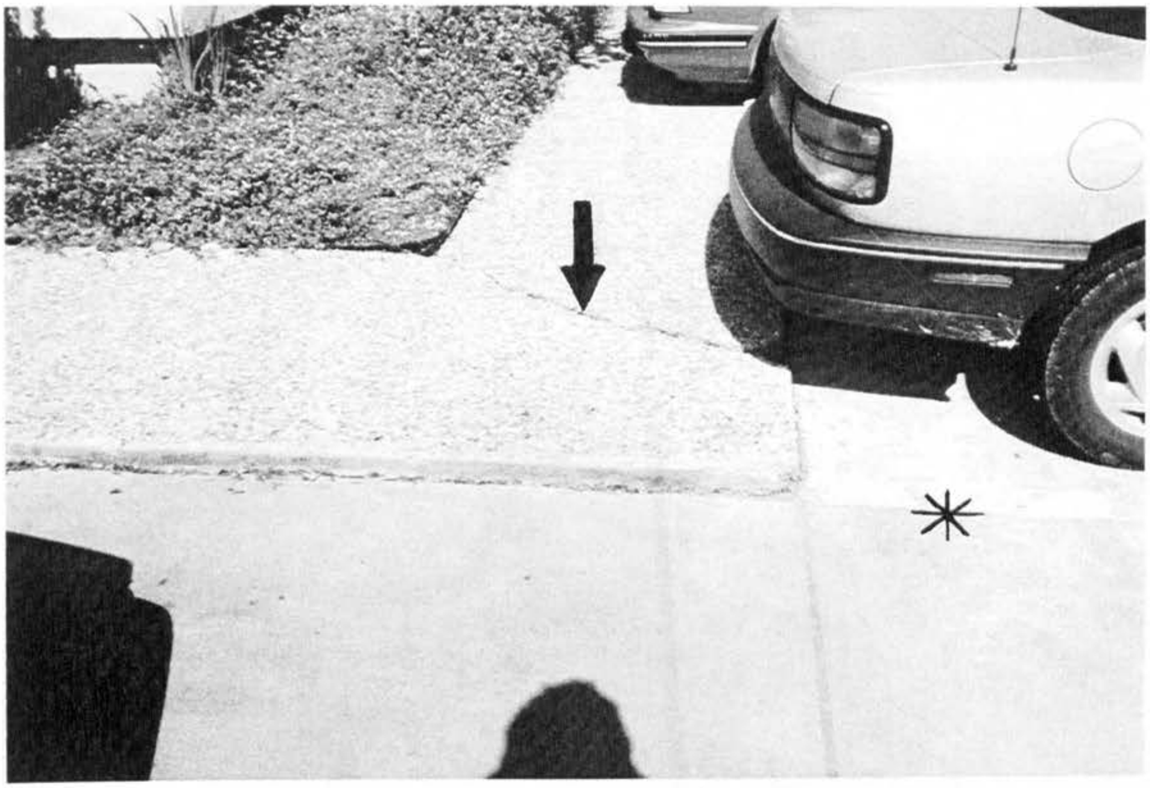
NORTH BRANCH WARD CREEK-BANK FAILURE AND ATTEMPTED SHEETPILE REPAIR; NOTE CONTINUED BANK MOVEMENT

FIGURE 1 (CON'T)

NORTH BRANCH WARD CREEK-SHEETPILE RETAINING WALL FAILURE

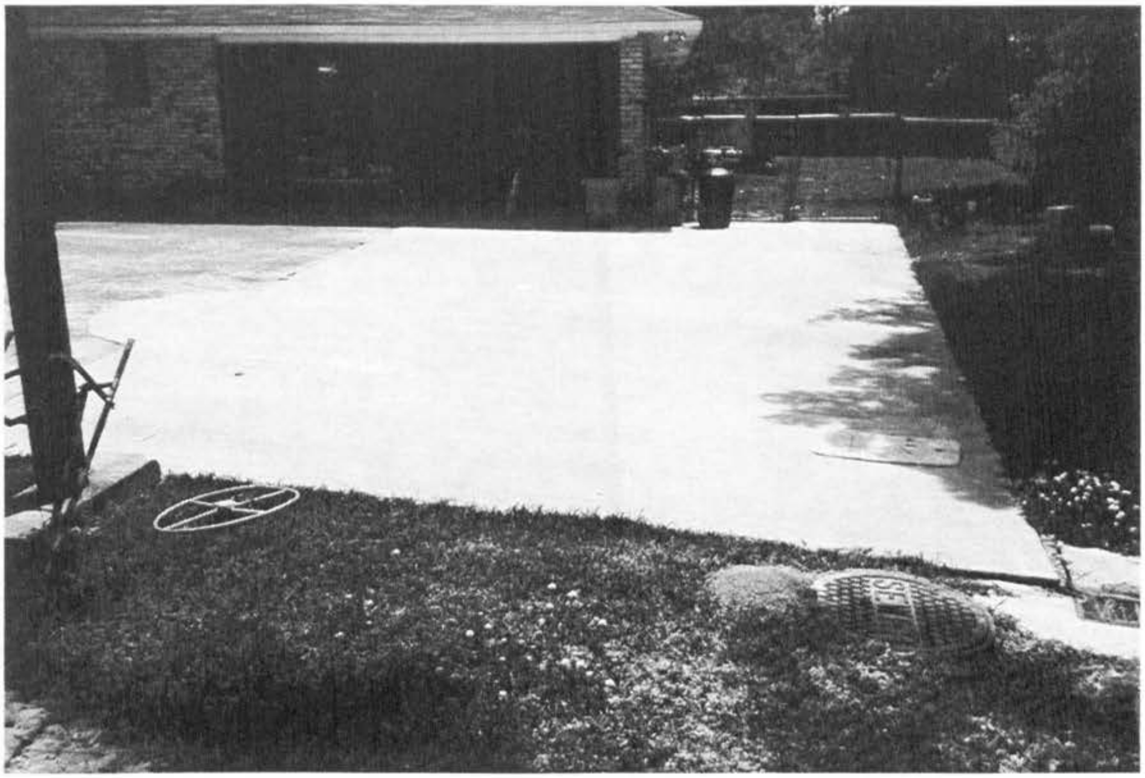
NORTH BRANCH WARD CREEK-BANK FAILURE; NOTE MOVEMENT TRANSLATION (*REFERENCE POINT NEXT PHOTO)

FIGURE 1 (CON'T)

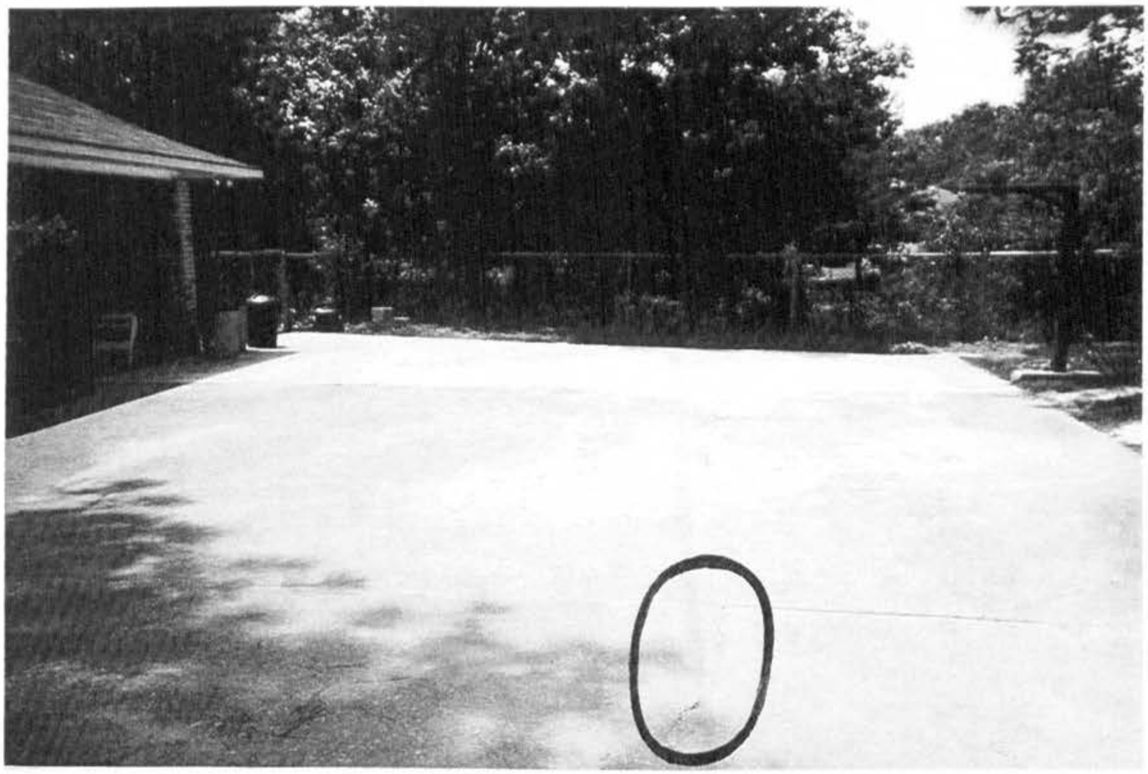


NORTH BRANCH WARD CREEK-EVIDENCE OF GROUND MOVEMENT
CLOSE TO BUILDING (*REFERENCE POINT PREVIOUS PHOTO)

FIGURE 1 (CON'T)



JONES CREEK-GRADE LEVEL, FENCE AND SLAB REPAIR (PARALLEL TO CREEK VIEW)



JONES CREEK-GRADE LEVEL, FENCE AND SLAB REPAIR (NORMAL TO CREEK VIEW); NOTE DAMAGE EXTENTION DISTANCE

FUTURE CONDITIONS (IF NO FEDERAL ACTION IS TAKEN)

The most probable future condition if no Federal action is taken are determined by projection. Conditions that will prevail in the area over the planning period 2000-2050. The conditions described are based on available information. This scenario serves as the base conditions to which all alternative plans were composed to assess the effect of each plan. For resources not described in this section, future conditions are not expected to be significantly different from existing conditions.

Economy and Human Resources

Population and economic growth in the area is expected to continue in the future. The exact locations of this growth would be influenced by many factors, including the availability of land throughout the area, construction costs, flood protection, environmental concerns, differences in lifestyles, and the proximity of housing to the work place and commercial centers. The economic potential of the area appears favorable in spite of recent declines in petrochemical industries. The area's mild climate, natural resources, port activities, and state government operations are major factors that would encourage growth. The population of East Baton Rouge Parish is expected to increase by about 170,000 people or 45 percent by the year 2047.

The growth rate between 1986 and 2047 is expected to average 0.6 percent annually. Table 17 shows the projected population for the parish. Tables 18 and 19 display pertinent data on anticipated population, earnings, and employment for the Baton Rouge Standard Metropolitan Area (SMSA). Statistical Area (SMSA). The Baton Rouge SMSA includes the parishes of East Baton Rouge, Ascension, Livingston, and West Baton Rouge.

Future Land Use

The projection of future land use was based upon three principles: knowledge of planned activities in the study area, awareness of constraints upon development, and the extension of

TABLE 17

PROJECTED POPULATION FOR EAST BATON ROUGE PARISH

1970	1980	1990	2000	2005	2015	2035	2040	2047
285,167	366,191	380,105	442,000	453,600	489,700	530,000	541,000	557,000

SOURCE: U.S. Army Corps of Engineers, New Orleans District

TABLE 18

POPULATION, PERSONAL INCOME, AND EARNINGS,

1969-1983, AND PROJECTED, 1990-2035

FOR BATON ROUGE, LA (MSA)

	1969	1973	1978	1983	1990	1995	2000	2005	2015	2035
Population as of July 1 (thousands)	371.0	407.4	466.8	531.1	572.3	599.5	622.0	643.1	693.2	751.0
	Millions of 1972 dollars									
Total personal income (place of residence)	1,350.8	1,601.4	2,337.4	2,798.1	3,573.4	4,065.0	4,532.4	4,996.3	5,849.0	7,549.9
By place of work										
Total earnings	1,106.2	1,282.1	1,859.9	2,005.9	2,662.9	3,049.7	3,430.0	3,795.0	4,389.9	5,444.7
Farm	11.7	17.5	8.7	9.5	12.0	11.3	11.0	10.9	11.1	12.2
Nonfarm	1,094.5	1,264.6	1,851.3	1,996.3	2,650.9	3,038.3	3,419.0	3,784.2	4,378.9	5,432.5
Private	885.1	995.5	1,517.0	1,599.7	2,161.8	2,489.7	2,807.5	3,107.2	3,597.3	4,471.3
Agricultural services, forestry, fisheries, and other	(D)	(D)	(D)	3.9	5.7	6.7	7.5	8.5	9.8	12.1
Mining	(D)	(D)	(D)	11.1	13.7	14.8	15.7	16.7	17.8	20.0
Construction	(D)	159.1	(D)	238.8	288.6	296.5	309.6	324.2	344.8	390.1
Manufacturing	262.0	282.8	378.1	377.0	509.9	581.3	646.3	705.9	816.3	1,016.6
Nondurable goods	227.5	244.1	325.8	333.1	434.7	487.0	534.7	578.2	661.9	815.1
Durable goods	34.5	38.6	52.3	43.9	75.2	94.2	111.6	127.7	154.3	201.5
Transportation and public utilities	64.1	82.0	116.9	133.5	182.0	210.6	241.4	272.1	322.4	409.1
Wholesale trade	(D)	(D)	(D)	122.4	169.4	195.3	221.4	248.5	290.3	359.1
Retail trade	117.5	138.5	194.4	213.5	267.0	305.5	344.4	378.9	430.7	538.0
Finance, insurance, and real estate	52.2	68.3	97.6	118.2	169.4	200.3	229.1	255.4	295.5	363.6
Service	(D)	(D)	(D)	381.3	556.1	678.7	792.1	896.9	1,069.6	1,362.7
Government and government enterprises	209.3	269.1	334.3	396.7	489.1	548.7	611.5	677.0	781.6	961.2
Federal, civilian	15.8	19.3	20.9	23.7	27.4	30.0	32.9	36.2	41.5	51.6
Federal, military	2.8	3.9	4.2	6.0	6.6	7.0	7.3	7.7	8.5	10.4
State and local	190.7	245.9	309.2	367.0	455.1	511.7	571.3	633.1	731.6	899.2

SOURCE: 1985 OBERS BEA REGIONAL PROJECTIONS, Volume 2, U.S. Department of Commerce, Bureau of Economic Analysis

TABLE 19

EMPLOYMENT

1969-1983, AND PROJECTED, 1990-2035

FOR BATON ROUGE, LA (MSA)

	1969	1973	1978	1983	1990	1995	2000	2005	2015	2035
Total employment	145.1	161.0	211.1	229.5	274.4	300.2	322.6	340.7	358.5	367.2
Farm	3.8	3.5	2.8	2.5	2.5	2.5	2.5	2.5	2.4	2.3
Nonfarm	141.3	157.6	208.4	227.0	271.9	297.6	320.1	338.3	356.1	364.9
Private	107.8	117.9	160.8	173.7	213.8	236.8	256.9	272.9	289.6	299.4
Agricultural services, forestry, fisheries, and other	(D)	(D)	(D)	.8	1.1	1.3	1.4	1.5	1.5	1.5
Mining	(D)	(D)	(D)	1.0	.9	.9	.9	.9	.8	.7
Construction	(D)	16.5	(D)	22.4	25.2	25.3	25.7	26.2	26.2	25.1
Manufacturing	21.7	21.5	24.7	22.4	26.0	27.6	28.8	29.7	30.6	30.9
Nondurable goods	17.8	17.6	19.8	18.5	20.4	21.2	21.9	22.3	22.8	22.8
Durable goods	3.9	4.0	4.9	4.0	5.6	6.3	6.9	7.3	7.7	8.0
Transportation and public utilities	7.3	8.0	10.0	10.6	12.3	13.2	14.2	15.0	15.9	16.2
Wholesale trade	(D)	(D)	(D)	11.4	14.4	16.0	17.3	18.6	19.9	20.8
Retail trade	21.9	25.1	35.0	40.9	50.6	56.9	62.6	67.2	72.0	75.5
Finance, insurance, and real estate	6.1	8.4	11.4	13.6	17.3	19.4	21.2	22.6	23.9	24.4
Service	(D)	(D)	(D)	50.1	66.0	76.3	84.8	91.3	96.8	104.3
Government and government enterprises	33.5	39.6	47.6	53.7	58.1	60.8	63.2	65.3	66.5	65.5
Federal, civilian	1.5	1.6	1.6	1.9	2.0	2.0	2.1	2.2	2.2	2.3
Federal, military	1.9	2.0	2.1	2.4	2.4	2.4	2.4	2.4	2.4	2.4
State and local	30.0	36.0	43.9	49.5	53.8	56.4	58.7	60.8	61.9	60.9

SOURCE: 1985 OBERS BEA REGIONAL PROJECTIONS, Volume 2, U.S. Department of Commerce, Bureau of Economic Analysis

historical trends. The methodology used to project future land use is contained in Appendix B. The land use projections were made for the U.S. Army Corps of Engineers by the Louisiana State Planning Office.

Substantial urban growth is expected to occur in East Baton Rouge Parish. The future land use projections indicate a strong growth trend for the Baton Rouge urbanized area toward the east southeast. The transportation facility provided by Interstate 10 and Airline Highway is undoubtedly a major factor in directionality of this growth. A second area of growth toward the east along Interstate 12 is also highly significant. Growth to the north and northeast is weak, though the Zachary-Baker area appears to have the strongest history of development in the sector. Future growth patterns described above are supported by the East Baton Rouge City Parish Planning Commission.

East Baton Rouge Parish has plenty of available land for expansion in all directions of the city of Baton Rouge except the west. Factors such as highway improvements, changes in attitudes toward certain areas, and the location of major employers could influence variances from the patterns predicted by the historical trends used for the projections in the study area.

For the purpose of projecting future land use, the area was grouped into eight regions. East Baton Rouge Parish is located in portion on all of 6 of the 8 regions. Regions followed subbasin boundaries as shown in Plate 4. Table 20 summarizes future land use in the region. The northwest region is an area of generally slow growth. In the time period preceding the period of record for this study, the area experienced a more rapid expansion due to the "urban retreat" of many of the blue collar workers from the industrial facilities of north Baton Rouge. These facilities have decreased employment in recent years and the growth of the area has correspondingly declined. Within the study period most of the growth recorded occurred in the area around Zachary, Louisiana. This is probably due, in part, to the influx of workers for the construction of the River Bend Nuclear Generator several miles to the north. Subbasin 1, located to

TABLE 20
FUTURE LAND USE BY GROWTH REGIONS, 1978-2047
(Acres)

			BATON ROUGE URBAN REGION				WATER, WET	
YEAR	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	AGRICULTURE	FOREST	TRANSITION	LANDS, QUARRY	TOTAL
1978	26809	9941	7451	4563	10316	961	1173	61214
1985	30431	10783	7576	3258	7608	297	1261	61214
1990	31369	11459	7665	2531	6880	46	1261	61211
1995	32073	11930	7755	2034	6137	23	1261	61212
1996	32213	12024	7772	1935	5988	18	1261	61212
1997	32354	12118	7790	1835	5839	14	1261	61212
2000	32776	12401	7844	1537	5393	0	1261	61212
2007	33211	12684	7969	1193	4896	0	1261	61214
2010	33397	12805	8023	1046	4683	0	1261	61215
2017	33769	13047	8148	831	4158	0	1261	61214
2020	33929	13150	8202	739	3933	0	1261	61214
2027	34108	13266	8327	656	3596	0	1261	61215
2030	34185	13316	8381	621	3451	0	1261	61215
2037	34356	13428	8506	487	3178	0	1261	61216
2040	34429	13476	8560	430	3061	0	1261	61217
2047	34600	13588	8685	296	2788	0	1261	61218

the west of Zachary is the most rapidly growing area. In projected to be a rapid growth area in the future. About 7.8% of the total growth in the study area is slated for this area which makes up over 13% of the total acreage in the study area.

The northeast is an area of very slow growth. Transportation routes to the area are not well developed and the area is quite a distance from major employers. Much of the land in subbasins 55, 56, 57, and 58 is within the actual valley of the Amite River and is ill-suited for development. The remaining subbasin, 53, is projected for slow growth which might increase upon the modification of transportation to the area. This area is not likely to contribute greatly to the problems associated with development within the foreseeable future. The entire area is slated for only about 1.5% of the growth for the study area while it covers about 12% of the total area.

This central region, located to the northeast of urbanized Baton Rouge, is likely to experience moderate growth in the future. Though transportation routes are inadequate, the area is near enough to the urbanized area to be highly likely to receive continued development. Portions of the region are within the valleys of the Amite and Comite and not suitable for development, which fact has and will continue to limit the growth in the area. Improvements to the transportation facilities in the area would likely increase the growth potential. The central region, while away from the growth focus for the study area, is likely to experience development at a nearly average rate for the study area. This area, representing roughly 4% of the study area, is projected to receive 3.5% of the area growth.

The Baton Rouge urban region is already heavily urbanized. Several of the subbasins are virtually completely developed at the present time (11, 15, 20, 23, 26, 27). Areas in the southern and eastern parts of this area are projected to become fully developed early in the projection period. The only subbasins not projected to be fully developed by 2040 are 16 (to the north), 24, and 48. While subbasin 16 is not likely to grow rapidly, subbasins 24 and 48 will likely become fully urbanized in the near future. The model apparently mispredicted for these two subbasins in part due to their small size.

Subbasin 21 is not projected for full urbanization until 2030. This subbasin contains two large parcels of land, the Burden tract and the Whitter tract, which may not develop in the foreseeable future. The Burden tract is administered by the Louisiana State University College of Agriculture as a park area and a research farm. The Whitter tract is owned by an individual who wishes the area remain in farmland and forest. Most of the remainder of the subbasin is fully developed at the present time. This region is projected to experience 14.9% of all growth in the study area despite its present high degree of urbanization and small areal extent of less than 8% of the total study area.

This rapidly developing southern region located to the south and southeast of the urbanized area contains the major traffic arteries, I-10 and Airline Highway. Major industrial sites are located along the Mississippi River portion of this region. The area serves as the place of residence for workers in both Baton Rouge and the river industries. Commercial growth is strong in the northern portion of the area, as well. Subbasins 43 and 60 will probably never become densely developed because much of the land is divided into parcels of one to five acres with single family residences located upon them. Subbasin 29 has a very great potential for growth as it is located quite near the center city of Baton Rouge and to the Louisiana State University major employer. It also borders on the Mississippi River which provides opportunities for industrial expansion. The five subbasins in this region, comprising only 7% of the study area, are projected to receive 29.7% of all growth in the study area. This region will show the greatest transformation of land uses by far.

Future urbanization will directly affect streamflow rates and flooding potential in the parish. This is therefore an important factor in determining future flood control needs. Increases in urban development were projected for each watershed under study. Projected urban land use, along with its increase over existing conditions, is shown in Table 21.

TABLE 21

EXISTING AND PROJECTED LAND USE

WATERSHED	EXISTING URBAN LAND USE FOR 1985 (in acres)	URBANIZATION AS PERCENT OF TOTAL LAND USE	PROJECTED URBAN LAND USE FOR 2040 (in acres)	URBANIZATION AS PERCENT OF TOTAL LAND USE
Blackwater Bayou	2882	31%	3742	40%
Beaver Bayou	2798	35%	3932	50%
Ward Creek	20208	71%	24702	97%
Jones Creek	12963	77%	15926	95%
Bayou Fountain	6420	25%	14863	65%
Claycut Bayou	4932	51%	9048	90%
Bayou Manchac	2625	35%	7099	94%

Source: U.S. Army Corps of Engineers, New Orleans District

Biological Resources

Problems to biological resources consist primarily of the loss of wooded lands and its associated wildlife habitat and habitat quality caused by residential and commercial development. All upstream development contributes to aquatic habitat problems because of the resulting amount of runoff from urban areas and the deterioration of water quality. Development of the wooded zone adjacent to the streams is a problem of major concern.

Water Resources

Future water use for the Louisiana portion of the Amite River Basin is shown on Table 22. Water use is expected to significantly increase between 1980 and 2040. Water supply sources have been determined to be capable of meeting the projected requirements in East Baton Rouge Parish.

There is no indication that water quality in the Comite River, Amite River, or Lake Maurepas would worsen in the future. In fact, it seems that the water quality of the aforementioned water bodies would improve as a result of the implementation of the waste management practices set forth in the Louisiana water quality management plan. The East Baton Rouge Parish's plan is to divert a large portion of the municipal waste that is currently being discharged to tributaries of the Amite River to the Mississippi River. This should improve water quality in the future.

Cultural Resources

Six trends affect preservation of cultural resources in the study area. The first is urbanization encroaching on the central basin from its western and southern edges. The region's annual flooding pattern has limited twentieth century settlement choices. As a consequence, construction has been roughly contained within corridors along major highways, inadvertently protecting riverine oriented prehistoric sites and early homesteads from rezoning and large scale clearing usually associated with construction of tract housing or light industry. This trend is slowly changing as developmental

TABLE 22

FUTURE WATER USE IN THE LOUISIANA PORTION OF AMITE RIVER BASIN
(million gallons per day)

		PUBLIC SUPPLY		INDUSTRIAL		POWER GENERATION		RURAL DOM.	LIVE STOCK		RICE		OTHER IRRIG.		AQUACULTURE		TOTAL		
	YEAR	GROUND	SURFACE	GROUND	SURFACE	GROUND	SURFACE	GROUND	GROUND	SURFACE	GROUND	SURFACE	GROUND	SURFACE	GROUND	SURFACE	GROUND	SURFACE	TOTAL
EAST	1990	58.80	0.00	93.54	128.34	6.80	3.87	2.43	0.19	0.03	0.00	0.00	0.15	0.00	0.15	0.00	162.06	132.74	294.80
BATON	2000	67.38	0.00	107.03	172.70	6.73	3.76	3.00	0.23	0.03	0.00	0.00	0.15	0.00	1.05	0.00	185.57	176.49	362.06
ROUGE	2010	85.21	0.00	120.52	216.56	6.67	3.65	3.57	0.27	0.03	0.00	0.00	0.14	0.00	1.10	0.00	217.48	220.24	437.72
	2020	102.50	0.00	134.01	260.42	6.60	3.54	4.15	0.31	0.03	0.00	0.00	0.14	0.00	1.16	0.00	248.87	263.99	512.86

Source: Louisiana Department of Transportation and Development

corridors widen. Clearing removes sites which are close to the surface, then exposes remaining deposits to lateral erosion from increased localized run-off. Riverine sites are directly impacted by development of recreational camps along the Amite River. Camp building, a second trend, localizes construction impact without areal clearing. Campsite selection echoes prehistoric and eighteenth century site selection, disturbing and adding a modern component to sites on the natural levee. Vandalism, a third trend, has been identified by the State Archeologist as prevalent near urban areas where obvious sites, such as mounds or those exposed by construction, are at jeopardy because of their accessibility. A fourth trend, also associated with development and land use change, is insensitive alteration or modification of historic structures which otherwise might be eligible to the National Register of Historic Places. Fifth is agricultural cropping north and east of Baton Rouge which disturbs subsurface deposits during clearing, plowing, and deep tilling of the soil. The final trend is prolonged flooding, followed either by alluviation or scouring of sites adjacent to channels. Scouring, which destroys site integrity, is a factor of elevational slope and natural channel migration. By contrast, alluvial and colluvial deposition buffers sites from shallow surface disturbance and may be interpreted as having some positive preservation benefit. All six of these trends are active in the study area, and can be expected to continue at present rates.

PROBLEMS, NEEDS, AND OPPORTUNITIES

Flood Control

Flooding is a reoccurring problem in East Baton Rouge Parish as indicated by data in Table 15. These floods have caused millions of dollars in damages.

There is a need to reduce or alleviate flood problems in East Baton Rouge Parish. Partial or full flood protection would reduce the financial risk involved to home owners and businesses. These opportunities could be realized by constructing storm water retention basins, channel modification, diversions levees, floodgates, pumping stations, floodplain management and nonstructural measures.

Streambank Erosion Problems

Soil conditions vary throughout the parish. In the south, streambanks generally consist of silts and clays and have only a moderate amount of erosion problems. In the central part of the parish combinations of clay, silt, loess, and sand occur along the streambanks. Where loess layers are significant, erosion rates are high, and in some locations extreme. In many locations, residential and commercial developments border these highly erodible streambanks and significant property losses have, and continue to occur. The northern part of the parish has far less loess on the streambanks, but numerous locations having loose sands exist. Erosion rates vary depending on the occurrence of these loose sands. Development in the north is less dense than the central part of the parish and few structures encroach on the streambanks. The opportunity exists to reduce streambank erosion problems where flood reduction measures are implemented.

Water Quality

Water quality in the basin has deteriorated in the lower basin due to municipal and industrial discharges, urban stormwater runoff, and to a lesser extent, agricultural runoff. The implementation of the state water quality management plan and East Baton Rouge Parish's plan to discharge most of municipal waste to the Mississippi River should improve water quality. The need to improve water quality of the Amite River and Tributaries extends beyond the expected benefits from the above and all opportunities to do so should be considered in plan development.

Biological Resources

There is a need to slow the trend of habitat and habitat quality reduction for both terrestrial and aquatic species. Mitigation opportunities for both terrestrial and aquatic species should be considered an essential part of any Federal action plan developed.

Recreation Resources

Population expansion in Baton Rouge would, in time, overload existing recreation facilities requiring additional park development to satisfy the greater demand. The Horizon Plan, a comprehensive land use plan developed by the East Baton Rouge City Planning Commission, and long range plans of BREC identify substantial recreational improvements, including bike trails, parks, and other features for future development.

PLANNING CONSTRAINTS

Legislative and executive authorities specify constraints and criteria that must be applied when evaluating alternative plans and the range of impacts to be assessed. In developing plans, tangible and intangible benefits and costs are considered as well as effects on the ecological, social, and economic well-being of the region. Federal participation in development requires that any plan be complete within itself, efficient and safe, economically feasible in terms of current prices, environmentally acceptable, and consistent with local, regional, and state plans.

The plan formulation goal for this study is to develop alternative plans to reduce flood damages caused by headwater and backwater flooding along major tributary streams in East Baton Rouge Parish. These tributary streams includes Jones Creed and tributaries, Ward Creek and Tributaries, Beaver Bayou and Tributaries, Blackwater Bayou and Tributaries, and Monte Sano Bayou. Flooding along with the Comite and Amite Rivers and lower tributary streams are being addressed in other studies.

Where possible, proposed improvements will be limited to the existing right-of-way owned by the parish adjacent to major drainage channels to minimize relocations of residents and businesses. Rights-of-way required for proposed channel modification could be extended, if necessary, beyond existing rights-of-way.

PLANNING OBJECTIVES

Planning objectives stem from national, state, and local water and related land resources management needs specific to the study area. These objectives have been developed through problem analysis and an intense public involvement program. They have provided the basis for plan formulation. The planning objectives are as follows:

a. Reduce flood damages associated with headwater and backwater flooding tributary streams in East Baton Rouge Parish.

b. Minimize adverse environmental and aesthetic impacts associated with the implementation of flood control measures.

c. Reduce streambank erosion in areas where channel modifications may be required.

d. Minimize to the extent possible the destruction of archaeological and historical resources.

e. Minimize particularly the loss of bottomland hardwood forest or if not possible, mitigate those losses "in kind" to the extent practicable.

f. Mitigate for all unavoidable impacts to significant fish, wildlife and wetland resources.

g. Locate mitigation sites inside the study area if practicable.

h. Incorporate to the extent possible recreation facilities in flood control plans to increase recreation opportunities.

DEVELOPMENT OF ALTERNATIVE PLANS

MANAGEMENT MEASURES

Structural measures considered for reducing flood damages includes the following:

Stormwater Retention Basins
Channel modification
Levees
Channel Diversion
Pump Station(s)

These measures would also address other planning objectives. Nonstructural measures considered included:

Floodplain Management
Raise Structures in Place
Build Small Earthen Levees or Floodwalls
Ring Levees around Selected Subdivisions
Flood Forecasting and Warning
Removal of Structures from Floodplain

PLAN FORMULATION RATIONALE

The Water Resources Council Principles and Guidelines require various alternative plans be formulated in a systematic manner to ensure that all reasonable alternatives are evaluated. Each alternative is to be formulated in consideration of four criteria: completeness, effectiveness, efficiency, and acceptability. Completeness is the extent to which a given alternative plan provides for all necessary investments or other actions to ensure the realization of the planned effects. Effectiveness is the extent to which an alternative plan alleviates the specified problems and achieves the specified opportunities. Efficiency is the extent to which an alternative plan is the most cost-effective means of alleviating the specified problems and realizing the specified opportunities, consistent with protecting the Nation's environment. Acceptability is the workability and viability of the alternative plan with respect for acceptance by state and

local entities and the public, and compatibility with existing laws, regulations, and public policies. In addition, mitigation of adverse effects is to be an integral part of each plan. In general, when formulating alternative plans, an effort is made to include only increments that increase the net NED benefits on a first- and last-added basis.

Plan formulation for the East Baton Rouge Parish study was an iterating and dynamic process. Initial plans formulated were based on the results obtained in the Initial Evaluation Report published in November 1984, previous Corps and state studies, and the East Baton Rouge Parish Department of Public Works Drainage Plan contain in the capital outlay budget and the Horizon Plan. Alternative plans were formulated watershed by watershed because the hydrology, for all practical purposes, is independent and would not be influenced from watershed to another. The Plan Formulation process is described in subsequent paragraphs watershed by watershed.

The Comite River Diversion Plan was not considered in the evaluation of initial alternatives. The Diversion Plan's effect was considered in the final analysis of the Tentatively Selected Plan. From this analysis, it was determined that this project does not significantly affect the plan formulation in any watershed. Stage lowerings will be realized in each watershed's lower most reaches from the Diversion. This only affects backwater flooding which, for all practical purposes, does not affect the anticipated performance of the Tentatively Selected Plan.

BLACKWATER BAYOU

The Blackwater Bayou Watershed is located north of the City of Baton Rouge. See Plate 2. Blackwater Bayou is a tributary of the Comite River. Major tributaries of Blackwater Bayou include Blackwater Bayou Tributaries #1 and #2. This watershed encompasses about 15 square miles.

Land use in the watershed is mostly agricultural and forest with urban lands making up 31 percent of the watershed. Land use maps for 1972 and 1985 are shown on Plates 2 and 3 of Appendix J. There are approximately 1,223 residential and commercial structures located within all flood zones in the watershed. The distribution of structures within the various floodplains is shown in Table 23. The approximate 10-year floodplain boundary is shown on Plate 5. Calculated without project equivalent annual flood damages for all subbasins in this watershed are listed in Table 24. Methodology used in calculating these values can be found in the Economics Appendix H.

Flooding in this watershed is primarily headwater in nature. Some backwater problems occur, but only in close proximity to the bayou's confluence with the Comite River. Backwater flooding is not a significant factor in this watershed. Interbasin flow from the Comite River occurs for flooding events above the 25-year events. Flood events above the 25-year event are predominantly Comite River flows and were addressed by the Comite River Diversion project.

POSSIBLE OPTIONS TO REDUCE FLOOD DAMAGES

Structural Measures

Detention/Retention Storage

Due to the lack of topographical relief in this watershed, detention/retention storage basins were determined to be impractical. Required basin containment structures, primarily earthen levees, in conjunction with land requirements would be excessive in order to achieve significant flow retention.

TABLE 23

BLACKWATER BAYOU - DISTRIBUTION OF STRUCTURES WITHIN VARIOUS FLOODPLAINS

BASIN NO.	STRUCTURE CATEGORY	0-10 YEAR	10-25 YEAR	25-50 YEAR	50-100 YEAR	100-500 YEAR	ABOVE 500 YEAR	ALL FLOOD ZONES
	BASIN NAME: BLACKWATER BAYOU WITHOUT PROJECT							
13	1-STORY	198	72	332	182	62	110	956
	2-STORY	24	3	9	7	2	5	50
	MOBILE HOME	4	5	21	9	21	101	161
	COMMERCIAL	10	5	18	10	4	9	56
	TOTAL	236	85	380	208	89	225	1,223

Source: U.S. Army Corps of Engineers, New Orleans District

TABLE 24

BLACKWATER BAYOU
CALCULATED WITHOUT PROJECT EQUIVALENT ANNUAL FLOOD DAMAGES

BASIN	REACH	EQUIVALENT ANNUAL DAMAGES WITHOUT PROJECT*
13	A	$ 294,000
	B	$ 284,000
	C	$ 168,000
	D	$ 301,000
	E	$ 23,000
	F	$3,492,000
	G	$ 478,000
	H	$ 13,000
	I	$ 523,000
	TOTAL	$5,581,000

* 2nd QUARTER 1994 PRICE LEVELS

Source: U.S. Army Corps of Engineers, New Orleans District

Channel Modifications

Channel improvements to the main stem and the large tributary of Blackwater Bayou were determined to be practical options and were investigated.

Hydrologic models indicate that inter-basin flow from the Comite River occurs for floods in excess of the 25-year event. It was therefore determined that channel modifications for Blackwater Bayou for larger flood events would be either ineffective and/or cost-prohibitive. Analysis was therefore limited to 25-year and 10-year channel designs, as well as a minimum scheme consisting of clearing and snagging the entire channel and tributaries. Alternative combinations that include or exclude both tributaries were considered for this analysis.

Hydraulic modelling and channel designs were performed to determine required channel modifications. Relocation of major channel obstructions (bridges and culverts) were also identified.

Although the presence of sands in some locations may necessitate some degree of erosion protection, general conditions in this watershed allow earthen channel design. The benefits of a concrete-lined channel were also considered and evaluated in these alternative plans.

A summary of initial structural alternative plans for Blackwater Bayou are shown in Table 25. Detailed alternative plan descriptions are listed in Table 26. Alternative plans are shown on Plates 11 through 15.

It was determined that the environmental impacts of channel modification alternative plans would generally be limited to the destruction of some bottomland hardwood forestation that occurs along the channel banks. These impacts can be readily mitigated by equivalent reforestation of existing cleared lands or by protecting equivalent areas of existing forested lands.

Existing disposal areas were investigated to avoid the adverse environmental impact. The East Baton Rouge Parish of Public Works identified the parish landfill as the place to

haul excavated material. Therefore, the initial cost estimates were developed assuming that excavated material would be hauled to this location. See Plate 51.

Nonstructural Measures

Nonstructural solutions for the Blackwater Bayou area include elevating or floodproofing structures, ring levees around selected subdivisions, buy-out and relocation of structures subject to repetitive flooding. The majority (est. 75 percent) of existing residential and commercial structures in the area are constructed on slab foundation. Subdivisions in this watershed are not densely congested and are spaciously developed. Ring levees around selected subdivisions could be economically favorable. Buy-out and relocation were evaluated in conjunction with other floodproofing techniques. Preliminary cost data indicated the cost per (flooded) structure for nonstructural alternatives were significantly higher than the cost per structure for channel modification plans. No nonstructural alternatives were, therefore, identified for analysis in the initial alternatives for the watershed.

TABLE 25

BLACKWATER BAYOU - INITIAL ALTERNATIVE PLAN SUMMARY

ALTERNATIVE PLAN	DESCRIPTION
BW-P1	10-Year Earthen Channel Without Tributaries
BW-P2	10-Year Earthen Channel With Tributary #1
BW-P3	25-Year Earthen Channel Without Tributaries
BW-P4	25-Year Earthen Channel With Tributary #1
BW-P5	10-Year Concrete-Lined Channel Without Tributaries
BW-P6	10-Year Concrete-Lined Channel With Tributary #1
BW-P7	Minimum Clearing and Snagging of Main Channel and Tributary #1
--	No Action

Source: U.S. Army Corps of Engineers, New Orleans District

TABLE 26

BLACKWATER BAYOU - INITIAL ALTERNATIVE PLANS

PLAN	CHANNEL	BOTTOM WIDTH	LOCATION
BW-P1	**Blackwater Bayou**		Improvements from Mouth to Greenwell Springs Road. 10-year earthen channel design.
		varies	Mouth to Hooper Road
		35'BW	Hooper Road to Old Settlement Road
		improve bridge	Blackwater Road (lengthen 50 ft)
		remove bridge	Abandoned bridge at Crumholt Road (remove)
		improve bridge	Crumholt Road (lengthen 112 ft)
		improve bridge	Carey Road (lengthen 50 ft)
		improve bridge	Dyer Road (lengthen 35 ft)
		improve bridge	Blackwater Road (lengthen 45 ft)
		improve bridge	McCullough Road (lengthen 35 ft)
		15'BW	Old Settlement Road to Greenwell Springs Road
		improve culvert	Greenwell Springs Road (clean existing culvert)
	Tributary #1		No Work
	Tributary #2		No Work
BW-P2	**Blackwater Bayou**		Improvements from Mouth to Greenwell Springs Road. 10-year earthen channel design
		varies	Mouth to Hooper Road
		35'BW	Hooper Road to Old Settlement Road
		improve bridge	Blackwater Road (lengthen 50 ft)
		remove bridge	Abandoned bridge at Crumholt Road (remove)
		improve bridge	Crumholt Road (lengthen 112 ft)
		improve bridge	Carey Road (lengthen 50 ft)
		improve bridge	Dyer Road (lengthen 35 ft)
		improve bridge	Blackwater Road (lengthen 45 ft)
		improve bridge	McCullough Road (lengthen 35 ft)
		15'BW	Old Settlement Road to Greenwell Springs Road
		improve culvert	Greenwell Springs Road (clean existing culvert)
	Tributary #1	5' BW	Mouth to McCullough Road
		improve bridge	Core Lane (lengthen 16 ft)
	Tributary #2		No Work

TABLE 26 (CONTINUED)

BLACKWATER BAYOU - INITIAL ALTERNATIVE PLANS

PLAN	CHANNEL	BOTTOM WIDTH	LOCATION
BW-P3	**Blackwater Bayou**		Improvements from Mouth to Greenwell Springs Road. 25-year earthen channel design
		70'BW	Mouth to Hooper Road
		50'BW	Hooper Road to Dyer Road
		improve bridge	Blackwater Road (lengthen 65 ft)
		remove bridge	Abandoned bridge at Crumholt Road (remove)
		improve bridge	Crumholt Road (lengthen 127 ft)
		improve bridge	Carey Road (lengthen 65 ft)
		improve bridge	Dyer Road (lengthen 35 ft)
		35'BW	Dyer Road to Old Settlement Road
		improve bridge	Blackwater Road (lengthen 45 ft)
		improve bridge	McCullough Road (lengthen 35 ft)
		15'BW	Old Settlement Road to Greenwell Springs Road
		improve culvert	Greenwell Springs Road (clean existing culvert)
	Tributary #1		No Work
	Tributary #2		No Work
BW-P4	**Blackwater Bayou**		Improvements from Mouth to Greenwell Springs Road. 25-year earthen channel design
		70'BW	Mouth to Hooper Road
		50'BW	Hooper Road to Dyer Road
		improve bridge	Blackwater Road (lengthen 65 ft)
		remove bridge	Abandoned bridge at Crumholt Road (remove)
		improve bridge	Crumholt Road (lengthen 127 ft)
		improve bridge	Carey Road (lengthen 65 ft)
		improve bridge	Dyer Road (lengthen 35 ft)
		35'BW	Dyer Road to Old Settlement Road
		improve bridge	Blackwater Road (lengthen 45 ft)
		improve bridge	McCullough Road (lengthen 35 ft)
		15'BW	Old Settlement Road to Greenwell Springs Road
		improve culvert	Greenwell Springs Road (clean existing culvert)
	Tributary #1	5'BW	Mouth to McCullough Road
		improve bridge	Core Lane (lengthen 16 ft)
	Tributary #2		No Work

TABLE 26 (CONTINUED)

BLACKWATER BAYOU - INITIAL ALTERNATIVE PLANS

PLAN	CHANNEL	BOTTOM WIDTH	LOCATION
BW-P5	**Blackwater Bayou**		Improvements from Mouth to Greenwell Springs Road. 10-year channel design (concrete lined)
		varies	Mouth to Hooper Road (earthen channel) 3.5:1 ss
		varies	Hooper Road to Old Settlement Road
		improve bridge	Blackwater Road (lengthen 15 ft)
		remove bridge	Abandoned bridge at Crumholt Road (remove)
		improve bridge	Crumholt Road (lengthen 68 ft)
		improve bridge	Carey Road (lengthen 10 ft)
		improve bridge	Dyer Road (lengthen 10 ft)
		improve bridge	Blackwater Road (lengthen 10 ft)
		improve bridge	McCullough Road (lengthen 10 ft)
		5'BW	Old Settlement Road to Greenwell Springs Road
		improve culvert	Greenwell Springs Road (clean existing culvert)
	Tributary #1		No Work
	Tributary #2		No Work
BW-P6	**Blackwater Bayou**		Improvements from Mouth to Greenwell Springs Road. 10-year channel design (concrete lined)
		varies	Mouth to Hooper Road (earthen channel) 3.5:1 ss
		varies	Hooper Road to Old Settlement Road
		improve bridge	Blackwater Road (lengthen 15 ft)
		remove bridge	Abandoned bridge at Crumholt Road (remove)
		improve bridge	Crumholt Road (lengthen 68 ft)
		improve bridge	Carey Road (lengthen 10 ft)
		improve bridge	Dyer Road (lengthen 10 ft)
		improve bridge	Blackwater Road (lengthen 10 ft)
		improve bridge	McCullough Road (lengthen 10 ft)
		5'BW	Old Settlement Road to Greenwell Springs Road
		improve culvert	Greenwell Springs Road (clean existing culvert)
	Tributary #1	5'BW	Mouth to McCullough Road
		improve bridge	Core Lane (lengthen 16 ft)
	Tributary #2		No Work

TABLE 26 (CONTINUED)

BLACKWATER BAYOU - INITIAL ALTERNATIVE PLANS

PLAN	CHANNEL	BOTTOM WIDTH	LOCATION
		improve culvert	Private Road (replace 4' circular culvert with three 10' x 6')
BW-P7		N/A	Minimal channel modification
	Blackwater Bayou		Mouth to Greenwell Springs Road - Clear and snag
	Tributary #1		Mouth to McCullough Road - Clear and snag
	Tributary #2		No Work

NOTE: All earthen channel design embankment slopes 3.5 H : 1.0 V; All concrete design slopes 3.0 H : 1.0 V

Source: U.S. Army Corps of Engineers, New Orleans District

Screening of Initial Alternative Plans

Project costs, benefits, and potential adverse environmental impacts were used as the screening mechanisms. In this iteration, only major cost items - construction, relocations, real estate, and annual operations and maintenance were developed. Benefits calculated in this part of the analyses were "direct" property inundation flood damage reductions plus an estimated percentage (20%) of "indirect" flood damage reduction benefits. "Indirect" items include such items as public agency emergency costs, flood insurance reductions, and lower construction costs within the floodplain.

Cost-benefit calculations for each alternative plan are shown in Table 27. A period of 50 years and an annual interest rate of 8.00% were used to calculate equivalent annual values. Costs and benefits shown are all relative to the base condition or "No Action" Plan. No mitigation cost was considered in the initial screening. However, methods to avoid adverse environmental impacts and mitigation measures were considered in plan formulation. It should be noted that costs and

benefits were not calculated for Plan BW-P7, minimal clearing and snagging of the main channel and tributaries. Initial hydraulic analysis indicated that only minimal stage lowerings could be achieved and that flood reduction benefits would be minimal. No further analysis was done on this plan since it was determined that it would not be a comprehensive solution to flood damage in this watershed.

TABLE 27

BLACKWATER BAYOU
ECONOMIC ANALYSIS OF INITIAL ALTERNATIVE PLANS

PLAN	FIRST COST	ANNUAL COSTS	INUNDATION REDUCTION BENEFITS	NET BENEFITS	B/C RATIO
BW-P1	$7,141,000	$637,000	$683,000	$46,000	1.07
BW-P2	$9,130,000	$821,000	$3,306,000	$2,485,000	4.03
BW-P3	$10,336,000	$908,000	$828,000	($80,000)	0.91
BW-P4	$12,195,000	$1,081,000	$3,465,000	$2,384,000	3.21
BW-P5	$19,405,000	$1,714,000	$694,000	($1,020,000)	0.40
BW-P6	$30,750,000	$2,732,000	$3,986,000	$1,254,000	1.46
BW-P7	N/A	N/A	N/A	N/A	N/A

Source: U.S. Army Corps of Engineers, New Orleans District

The cost-benefit calculations revealed that four of the six plans have higher benefits relative to their costs. Both the 10-year and 25-year channel modification plans, that include Tributary, No. 1 have net benefits that are significantly higher than all other alternative plans. In addition to these two plans, only Plan BW-P6, concrete lined channel and Tributary, No. 1 had significant net benefits relative to base conditions. Net benefits for this plan were determined to be significantly less than the two earthen channel options. Since this concrete lined channel plan is significantly more costly, it was not considered further.

Analysis of Final Alternative Plans

Plans selected for final analyses are: BW-P2, 10-year earthen channel modification with Tributary No.1; BW-P4, 25-year earthen channel modification with Tributary No.1; and No Action. Since no alteration was made to either plan, details shown in the Initial Alternative Plans are the same. Final alternative plans were evaluated relative to National Economic Development, Environmental Quality, Regional Economic Development, and Social Effects. A summary of this analyses is shown in Table 28.

National Economic Development (NED)

In the final analyses, environmental mitigation costs were included in each alternative plan's cost. It should be noted that the mitigation plan combines all mitigation requirements from all watersheds. Consolidating mitigation sites was determined to be far more practical than establishing individual mitigation sites for each watershed in the study area. Costs were prorated to each watershed based on the amount of the alternative plan woodland habitat losses. A complete description of the mitigation plan and analysis can be found in Appendix E, Section 1.

Alternative plan benefits and costs are listed in Table 28. As in the initial screening, a period of 50 years and 8.00% annual interest were used. Alternative Plan BW-P2, the 10-year earthen channel, has the highest estimated net annual benefits of $2,419,000. This is just slightly higher than the $2,270,000 per year net benefits estimated for Plan BW-P4, the 25-year earthen channel. Both plans obviously have significant net economic benefits relative to No Action. Relative to each other, the estimated difference is very small and probably well within uncertainty and error margins, Plan BW-P2 does, however, have a significantly lower total first cost of $9,838,000 relative to the $13,409,000 for Plan BW-P4. This difference makes the 10-year earthen channel plan preferable relative to NED criteria.

TABLE 28
BLACKWATER BAYOU FINAL ALTERNATIVES SUMMARY OF COMPARATIVE ITEMS

	ITEM	BW-P2 (TENTATIVELY SELECTED PLAN)	BW-P4	NO ACTION
I.	PLAN DESCRIPTION	10-YEAR EARTHEN CHANNEL WITH TRIBUTARY #1	25-YEAR EARTHEN CHANNEL WITH TRIBUTARY #1 #1 AND #2	
II.	NATIONAL ECONOMIC DEVELOPMENT			
	A. PROJECT FIRST COST	$9,838,000	$13,409,000	$0
	B. O&M COST	$51,000	$56,000	$0
	C. TOTAL AVERAGE ANNUAL COSTS	$887,000	$ 1,195,000	$0
	D. TOTAL AVERAGE ANNUAL BENEFITS	$3,306,000	$ 3,465,000	$0
	E. NET ANNUAL BENEFITS	$2,419,000	$ 2,270,000	$0
	F. BENEFIT-COST RATIO	3.70	2.90	N/A
III.	ENVIRONMENTAL QUALITY			
	A. AGRICULTURAL LANDS	127 ACRES DIRECTLY IMPACTED BY FOREST REPLANTING	217 ACRES DIRECTLY IMPACTED BY FOREST REPLANTING	SOME ADVERSE IMPACT DUE TO RECURRING FLOODING
	B. FORESTLANDS	77 ACRES AFFECTED BY PROJECT; 127 ACRES WOULD BE CREATED VIA MITIGATION	141 ACRES AFFECTED BY PROJECT; 217 ACRES WOULD BE CREATED VIA MITIGATION	MINISCULE REDUCTION
	C. THREATENED AND ENDANGERED SPECIES	NONE AFFECTED	NONE AFFECTED	NONE AFFECTED
	D. AQUATIC RESOURCES AND WATER QUALITY	SHORT-TERM ADVERSE IMPACT DURING CONSTRUCTION; LONG-TERM EFFECTS MINOR	(SAME AS BW-P2)	NO IMPACT

TABLE 28 (CONTINUED)
BLACKWATER BAYOU FINAL ALTERNATIVES SUMMARY OF COMPARATIVE ITEMS

ITEM		BW-P2 (TSP)	BW-P4	NO ACTION
	E. SEDIMENTATION	PROJECT WILL REDUCE STREAMBANK EROSION; LARGER CHANNEL WILL INCREASE DEPOSITION	(SAME AS BW-P2; SLIGHTLY WORSE)	NO IMPACT
	F. AIR QUALITY	MINOR SHORT-TERM IMPACTS DURING CONSTRUCTION	(SAME AS BW-P2)	NO IMPACT
	G. NATIONAL REGISTER OF HISTORIC PLACES	NO IMPACT	NO IMPACT	NO IMPACT
	H. CULTURAL PROPERTIES	THREE SITES ARE KNOWN TO OR PROBABLY EXIST IN PROJECT AREA. MODERATE CHANCE OF UNCOVERING UNKNOWN SITES. EFFORT TO IDENTIFY SITES WILL BE MADE AND WORK CAN BE DESIGNED TO AVOID ANY SIGNIFICANT SITES.	(SAME AS BW-P2)	NO IMPACT
IV.	<u>REGIONAL ECONOMIC DEVELOPMENT</u>			
	A. REGIONAL INCOME AND EMPLOYMENT	IMPROVED VALUE WILL LIKELY FACILITATE URBAN GROWTH	(SAME AS BW-P2; SLIGHTLY BETTER)	INCOME AND BUSINESS MAY BE REDUCED DUE TO RECURRING FLOODING
	B. REGIONAL GROWTH AND BUSINESS ACTIVITY	INCREASED EMPLOYMENT FOR CONSTRUCTION; BETTER ECONOMIC CLIMATE DUE TO REDUCTION IN FLOOD THREAT	(SAME AS BW-P2; SLIGHTLY BETTER)	INCOME AND BUSINESS MAY BE REDUCED DUE TO RECURRING FLOODING
	C. TAX REVENUE	IMPROVED FLOOD PROTECTION WILL STABILIZE TAX BASE	(SAME AS BW-P2; SLIGHTLY BETTER)	INCOME AND BUSINESS MAY BE REDUCED DUE TO RECURRING FLOODING
	D. PROPERTY VALUE	IMPROVED FLOOD PROTECTION WILL LIKELY STABILIZE OR RAISE PROPERTY VALUES	(SAME AS BW-P2; SLIGHTLY BETTER)	PROPERTY VALUES MAY DECLINE DUE TO RECURRING FLOODING

TABLE 28 (CONTINUED)
BLACKWATER BAYOU FINAL ALTERNATIVES SUMMARY OF COMPARATIVE ITEMS

	ITEM	BW-P2 (TSP)	BW-P4	NO ACTION
V.	SOCIAL EFFECTS			
	A. URBAN AND COMMUNITY IMPACTS	POSITIVE IMPACTS DUE TO IMPROVED FLOOD PROTECTION	(SAME AS BW-P2; SLIGHTLY BETTER)	ADVERSE IMPACTS DUE TO FLOOD THREAT
	B. LIFE, HEALTH, AND SAFETY	THREAT TO LIFE, HEALTH, AND SAFETY REDUCED	(SAME AS BW-P2; SLIGHTLY BETTER)	RECURRING FLOODS THREATEN LIFE, HEALTH, AND SAFETY
	C. DISPLACEMENT	SOME TAKING OF UNIMPROVED PRIVATE PROPERTY (260 acres)	(SAME AS BW-P2)	NO IMPACT
	D. LONG-TERM PRODUCTIVITY	POSITIVE IMPACT DUE TO REDUCED FLOOD THREAT	(SAME AS BW-P2; SLIGHTLY BETTER)	ADVERSE IMPACTS DUE TO FLOOD THREAT
	E. LEISURE	NO IMPACT	NO IMPACT	NO IMPACT
	F. AESTHETIC	SOME ADVERSE IMPACT BY REMOVING TREES FROM CHANNELS; MITIGATED WITH REPLANTED TREE LINE	(SAME AS BW-P2)	NO IMPACT
	G. COMMUNITY COHESION	PRESERVED DUE TO REDUCED FLOOD THREAT	(SAME AS BW-P2; SLIGHTLY BETTER)	ADVERSE IMPACTS DUE TO FLOOD THREAT
	H. COMMUNITY GROWTH	POSITIVE IMPACT DUE TO REDUCED FLOOD THREAT	(SAME AS BW-P2; SLIGHTLY BETTER)	ADVERSE IMPACTS DUE TO FLOOD THREAT
	I. TRANSPORTATION	MINOR DISRUPTION DURING CONSTRUCTION; IMPROVED SITUATION BY REDUCING FLOODING	(SAME AS BW-P2; SLIGHTLY BETTER)	SOME ADVERSE IMPACTS DURING FLOOD EVENTS
	J. NOISE	MINOR INCREASE IN NOISE DURING CONSTRUCTION	(SAME AS BW-P2)	NO IMPACT
	K. QUALITY OF LIFE	REDUCED FLOODING WILL SUBSTANTIALLY IMPROVE THE QUALITY OF LIFE FOR THOSE AFFECTED	(SAME AS BW-P2; SLIGHTLY BETTER)	ADVERSE IMPACTS FOR THOSE AFFECTED BY FLOODING

SOURCE: U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT

Environmental Quality

Impacts on the following environmental factors were evaluated for each final alternative plan:

- Agricultural Lands
- Forestlands
- Threatened and Endangered Species
- Aquatic Resources and Water Quality
- Sedimentation
- Air Quality
- Historic Places
- Cultural Properties

Detailed analyses of these factors can be found in the Environmental Impact Statement and in Appendix E. Impacts are listed in summary in Table 28.

The only significant and long-lasting environmental impacts produced by the final alternative plans affect agricultural lands, forestlands, and floodplains. Both Alternative Plans BW-P2 and BW-P4 directly impact forestlands, 77 acres and 141 acres, respectively. This in turn indirectly impacts less significant agricultural lands as they are proposed to be converted to forestlands as mitigation for same. Plan BW-P2 will require 129 acres and Plan BW-P4 217 acres for reforestation mitigation. The loss of these agricultural land acres is not considered to be significant for this area. Flood stage lowerings associated with Plans BW-P2 and BW-P4 reduce the size of the 100-year floodplain.

Relative to each other, Alternative Plans BW-P2, the 10-year earthen channel, impacts significantly less agricultural and floodplain acres than does Plan BW-P4, the 25-year earthen channel. Therefore, next to No Action, Alternative Plan BW-P2 is the preferable alternative from an environmental quality standpoint.

Regional Economic Development

Reducing flood damage frequency and cost will improve economic growth, employment, property valuation, and tax revenue in the region. Conversely, allowing flooding to

continue to occur could likely result in decreasing same. Direct economic benefits to existing property is included in the NED estimates above. Induced economic benefits are speculative to a large degree and are not calculated directly into the benefit-cost analysis. These items are addressed in the Economics Appendix H and are listed in summary in Table 28.

Both Plans BW-P2 and BW-P4 will significantly reduce flooding frequency and cost and therefore are far preferable to No Action given economic development considerations. Relative to each other, construction of the 25-year earthen channel alternative plan, BW-P4, will result in less frequent flooding and lower flood damages versus BW-P2, the 10-year plan.

Social Effects

Social effects considered in evaluating each alternative plan are listed in Table 28. Health, safety, and the quality of community life will obviously be significantly improved by both channel modification plans. Homes and businesses would be flooded less frequently. While no homes or businesses will be displaced, construction of either channel modification plan will, however, require the permanent taking of some private property. It was estimated that 260 acres of land are required for proposed channel enlargements for both BW-P2 and BW-P4. Almost all of the property required to be taken is either agricultural, pasture, rural, or vacant. This property loss will be a significant impact to the specific owners. Additionally, some minor traffic disruptions will occur in both plans in association with required bridge relocations.

Relative to No Action, the beneficial social impacts of both channel modification plans appear to far outweigh their adverse effects. The higher level of flood reduction associated with Plan BW-P4 appears to outweigh its higher real estate requirements relative to BW-P2. Therefore, the 25-year earthen channel, BW-P4, is preferable in this category.

Trade-Off Analyses and Plan Selection

The economic and social benefits of both channel modification alternative plans are far more significant than the slight environmental quality advantage of No Action.

Relative to each other, Alternative Plan BW-P2, 10-year earthen channel modifications, has an advantage in NED and environmental quality categories while Plan BW-P4 has some relative advantages concerning regional economic development and, to a lesser extent, social effects.

There is no question that both channel modification plans would significantly reduce flooding in the watershed and will have significant positive net benefits. There is therefore no apparent risk of non-performance of either plan. There are, however, uncertainties associated with project costs and flood reduction damage estimates. Calculated flood stage-frequencies, structure and content valuation, and project construction costs are sensitive to a wide range of variables considered in this evaluation. While these uncertainties were not quantified, it is obvious that the relative advantage in net economic benefits is smaller than the range of uncertainty. The uncertainty range will, for the most part, affect each alternative plan in a similar way. That is to say, that any significant change in variables that results in changing net values in one plan will almost certainly affect the other in the same fashion, but perhaps with a slightly greater or lesser magnitude.

Within the range of uncertainty and in consideration of all factors, there is very little net difference between Plans BW-P2 and BW-P4. Independent of uncertainties is the significant relative first cost advantage of Alternative Plan BW-P2. Based on the above, the 10-year earthen channel modification plan, Alternative Plan BW-P2, is the preferred structural alternative for this watershed.

Due to the presence of sandy soils in the area, the possibility exists that some erosion control measures will be needed on portions of any proposed channel enlargement. A system of geosynthetic fabric and rock would be proposed for these reaches. It is estimated that such a system would be rather costly at approximately $800,000 per mile of channel.

Should erosion control measures be required, up to $10 million of cost could be added to any of the above considered channel modification plans. Relative to each other, there would be no net difference and plan BW-P2 would still be

the preferred plan. With erosion control measures on its entire length, this plan would still generate net benefits of approximately $1,500,000 per year and have a benefit to cost ratio of 1.4 to 1. Added costs of this magnitude would, however, make the economics of selected nonstructural measures comparable to this plan.

Comparison to Selected Nonstructural Measures

With the inclusion of proposed erosion control measures for the entire channel length, the preferred channel modification plan for this watershed exhibits a relatively high cost per structure in the affected floodplains. For this reason, selected nonstructural alternatives were revisited and evaluated in further detail.

Elevating residential structures in combination with constructing earthen ring levees around individual commercial structures was determined to be both the most practical and comprehensive nonstructural options for this watershed. While it may not be possible to elevate all residential structures, or ring levee every commercial structure, for the purposes of this analysis it was assumed that this could be accomplished for all affected structures.

Two options, elevating residential structures and installing ring levees around commercial structures in the 10-year and 25-year floodplains were evaluated. In both cases, structures would be elevated or protected up to the 100-year flood elevation plus one foot. (This elevation is consistent with the parish's ordinance on new construction).

Structures in the 10 and 25-year floodplains were identified and the required height of elevation or levee protection for each was calculated. Structures were grouped by this requirement and, for residential, by construction type (pier or slab). Table 29 and 30 list these structure groupings for the 10- and 25-year floodplains. Costs for these alternatives were determined from generalized estimates of elevating an average size house (1,750 square feet), given the height of raising and the type of construction. Ring levee costs were also based on a generalized approach of considering a 400-foot long levee around each commercial structure.

Tables 31 and 32, respectively, illustrate these costs for residential structure raising and ring levee construction.

The cost of elevating/protecting all residential and commercial structures in the 10-year floodplain is estimated at \$11,500,000. This cost includes added contract administration (10%) and contingencies (20%). Implementation of elevating/protecting over 200 structures would take a relatively long period of time, an estimated 4 years. Thus, the estimated total gross investment cost of this plan (includes interest lost during construction) is \$13,463,000. The estimated first and gross investment costs for elevating/protecting approximately 240 structures in the 25-year floodplain are \$13,750,00 and \$16,097,000, respectively.

Flood damage reduction benefits were calculated for both the 10-year and 25-year floodplain structure elevation/protection plans. In both cases, flood damage reductions would be quite extensive. For the 10-year plan approximately 77%, or \$3,373,000 per year, of all flood damages would be eliminated in the entire watershed. This value increases to 83%, or \$3,616,000 per year, for the 25-year nonstructural plan.

At 8 percent interest rate over a 50-year period, the net economic benefits for the 10-year plan are estimated at \$2,272,000 per year with a benefit-to-cost ration of 3.1 to 1. Estimates net economic benefits for the 25-year plan are estimated at \$2,300,000 per year with a benefit to cost ratio of 2.7 to 1. Based on this analysis, elevating/protecting all structures in either the 10 or 25-year floodplain yield virtually the same net benefits.

In comparison to the preferred channel modification plan, including maximum erosion control costs, either nonstructural plan has higher calculated net economic benefits. Several important factors, however, do not make thess plans preferable to the channel modification plan. First, the maximum cost of the channel modification plan includes erosion control measures for the proposed entire 13-mile length of project. While it will not be determined until extensive soil borings are taken during preconstruction design, it is expected that these measures will not be needed for a large portion of the project

area. If only 50 percent of the erosion control items are needed, the first cost of this plan will be reduced by approximately 5 million dollars. This expected first cost reduction, if realized, increases this plan's net economic benefits to a level comparable to the nonstructural plan. The net economic benefits are probably higher for the channel modification plan because an idealized situation was assumed for the nonstructural plan. It was assumed that all structures in the floodplain could be elevated or ring levee provided. If a structure by structure analysis would be conducted, some structures would not be suitable for nonstructural measures. Many structures may not withstand raising nor may have the physical space for a ring levee or floodwall.

Based on the above, there appears to be an overall relative advantage to the 10-year channel modification plan versus nonstructural measures. This plan was, therefore, chosen as the tentatively selected plan for this watershed.

TABLE 29

BLACKWATER BAYOU - ESTIMATED NUMBER OF STRUCTURES, TYPE OF CONSTRUCTION AND RAISING REQUIREMENTS FOR THE 10-YEAR FLOODPLAIN

RESIDENTIAL STRUCTURES

HEIGHT TO BE RAISED (FT)*	NUMBER OF STRUCTURES	ESTIMATED NUMBER OF SLAB STRUCTURES	ESTIMATED NUMBER OF PIER STRUCTURES
2.5 - 3.5	110	83	27
3.5 - 4.5	60	45	15
4.5 - 5.5	13	10	3
5.5 - 6.5	11	8	3
>6.5	2	1	1
TOTAL	196	147	49

COMMERCIAL STRUCTURES

REQUIRED RING LEVEE HEIGHT (FT)*	NUMBER OF STRUCTURES
2.5 - 3.5	1
3.5 - 4.5	2
4.5 - 5.5	1
5.5 - 6.5	1
>6.5	5
TOTAL	10

* REQUIRED TO PROTECT STRUCTURE UP TO THE 100-YEAR FLOOD PLUS ONE FOOT.

TABLE 30

BLACKWATER BAYOU - ESTIMATED NUMBER OF STRUCTURES, TYPE OF CONSTRUCTION AND RAISING REQUIREMENTS FOR THE 25-YEAR FLOODPLAIN

RESIDENTIAL STRUCTURES

HEIGHT TO BE RAISED (FT)*	NUMBER OF STRUCTURES	ESTIMATED NUMBER OF SLAB STRUCTURES	ESTIMATED NUMBER OF PIER STRUCTURES
2.5 - 3.5	60	45	15
3.5 - 4.5	127	95	32
4.5 - 5.5	16	12	4
5.5 - 6.5	13	10	3
>6.5	13	10	3
TOTAL	229	172	57

COMMERCIAL STRUCTURES

REQUIRED RING LEVEE HEIGHT (FT)*	NUMBER OF STRUCTURES
2.5 - 3.5	2
3.5 - 4.5	3
4.5 - 5.5	0
5.5 - 6.5	4
>6.5	5
TOTAL	14

* REQUIRED TO PROTECT STRUCTURE UP TO THE 100-YEAR FLOOD PLUS ONE FOOT

TABLE 31

ESTIMATED COST PER SQUARE FOOT TO ELEVATE RESIDENTIAL STRUCTURES

TYPE OF CONSTRUCTION	HEIGHT 3 FT	4 FT	5 FT	6FT
SLAB	$27.00/S.F.	$29.00/S.F.	$31.00/S.F.	$33.00/S.F.
PIER	$15.00/S.F.	$16.00/S.F.	$17.00/S.F.	$18.00/S.F.

TABLE 32

ESTIMATED UNIT COST FOR EARTHEN RING LEVEES

Height Above Ground	CY/LF	$/LF
1 FT	0.22	$ 10.00
2 FT	0.74	$ 20.00
3 FT	1.56	$ 35.00
4 FT	2.67	$ 55.00
5 FT	4.07	$ 75.00
6 FT	5.78	$100.00

NOTE: The costs for the ring levees represents the following:

a) a levee cross-section with 1 on 4 side slopes
b) yardage per foot is in-place measurement
c) fill material is truck-hauled @ $75 per truckload
d) compaction effort by dozers
e) levee surface is sodded

The costs exclude the following:

a) contingencies
b) repairs to concrete drives/sidewalks
c) interior drainage and modifications to utilities

BEAVER BAYOU

The Beaver Bayou Watershed is located northeast of the City of Baton Rouge (see Plate 2). Beaver Bayou is a tributary of the Comite River. Major tributaries of Beaver Bayou include Beaver Bayou Lateral Tributary and Tributary #2. This watershed encompasses about 12 square miles. This watershed shares many of the same characteristics as the Blackwater Bayou watershed.

Land use in the watershed is mostly agricultural and forest with urban lands making up 36 percent of the watershed. Land use maps for 1972 and 1985 are shown on Plates 4 and 5 of Appendix J. There are approximately 1,800 residential and commercial structures located within all flood zones in the watershed. The distribution of structures within the various floodplains is shown in Table 33. The approximate 10-year floodplain boundary is shown on Plate 5. Calculated without project equivalent annual flood damages for all subbasins in this watershed are listed in Table 34. Methodology used in calculating these values can be found in the Economics Appendix H.

Flooding in this watershed is primarily headwater in nature. Some backwater problems occur, but only in close proximity to the bayou's confluence with the Comite River. Backwater flooding is not a significant factor in this watershed.

POSSIBLE OPTIONS TO REDUCE FLOOD DAMAGES

Structural Measures

Detention/Retention Storage

Due to the lack of topographical relief in this area, detention/retention storage basins were determined to be impractical. Required basin containment structures, primarily earthen levees, in conjunction with land requirements would be excessive in order to achieve significant flow retention.

TABLE 33
BEAVER BAYOU
DISTRIBUTION OF STRUCTURES WITHIN VARIOUS FLOODPLAINS

BASIN NO.	STRUCTURE CATEGORY	0-10 YEAR	10-25 YEAR	25-50 YEAR	50-100 YEAR	100-500 YEAR	ABOVE 500 YEAR	ALL FLOOD ZONES
	BASIN NAME: BEAVER BAYOU WITHOUT PROJECT							
14	1-STORY	315	72	39	112	69	640	1,247
	2-STORY	14	2	1	4	4	28	53
	MOBILE HOME	9	19	8	9	12	195	252
	COMMERCIAL	95	8	2	7	2	133	247
	TOTAL	433	101	50	132	87	996	1,799

SOURCE: U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT

TABLE 34
BEAVER BAYOU
CALCULATED WITHOUT PROJECT EQUIVALENT ANNUAL FLOOD DAMAGES

BASIN	REACH	EQUIVALENT ANNUAL DAMAGES WITHOUT PROJECT*
14	A	$ 0
	B	$ 31,000
	C	$ 23,000
	D	$ 29,000
	E	$ 518,000
	F	$ 373,000
	G	$ 2,690,000
	H	$ 4,117,000
	I	$ 1,586,000
	J	$ 44,000
	K	$ 354,000
	L	$ 642,000
	TOTAL	$10,407,000

* 2ND QUARTER 1994 PRICE LEVELS

SOURCE: U.S. ARMY CORPS OF ENGINEERS

Channel Modifications

Channel modification of the main stem of Beaver Bayou was determined to be practical and was investigated. Modifications to the tributaries were not considered since flow rates are too low to qualify for federal flood control participation.

Because the backwater effects of the Comite River extend from the mouth of Beaver Bayou to a point approximately 2,500 feet downstream of Greenwell Springs Road, channel modification in this reach was limited to clearing and snagging. In general, the channel modification upstream of Greenwell Springs Road was designed to contain headwater flows to within banks for the design frequencies. Four levels of designs were initially developed for this watershed: the 10-year, 25-year, 50-year, and 100-year. Early hydrologic investigation indicated that it would not be practical to contain the 100-year event within banks. Even with extensive channel modifications, the 100-year event would be out of banks for the entire stream length and was therefore eliminated from further study. In addition, since the 10-year design required some channel enlargement, a minimum channel design alternative that required only clearing and snagging was analyzed. Right-of-way restrictions on Beaver Bayou Lateral from Hooper Road to just upstream of Devall Road prevented any earthen channel enlargement. As such, this reach was concrete-lined for the 10-year, 25-year, and 50-year designs.

Alternative combinations that include or exclude both tributaries were established for this analysis.

Hydraulic modelling and channel designs were performed to determine required channel modifications. Relocation of major channel obstructions (bridges and culverts) were also identified.

Although the presence of sands in some locations may necessitate some degree of erosion protection, general conditions in this watershed allow earthen channel design. The benefits of a concrete-lined channel were also considered and evaluated in these alternative plans. No initial screening was conducted for nonstructural measure. Nonstructural measures

were evaluated against the preferred structural plan (see discussion below.

A summary of initial study alternative plans for Blackwater Bayou are shown in Table 35. Detailed alternative plan descriptions are listed in Table 36. Alternative plans are shown on Plates 11 through 15.

It was determined that the environmental impacts of channel modification alternative plans would generally be limited to the destruction of some bottomland hardwood forestation that occurs along the channel banks. These impacts can be readily mitigated by equivalent reforestation of existing cleared lands or by protecting equivalent areas of existing forested lands.

Existing disposal areas were investigated to avoid adverse environmental impacts. The East Baton Rouge Parish of Public Works identified the parish landfill as the place to haul excavated material. Therefore, the initial cost estimates were developed assuming that excavated material would be hauled to this location. See Plate 51.

Nonstructural Measures

Nonstructural solutions for the Beaver Bayou area include elevating or floodproofing structures, ring levees around selected subdivisions, buy-out and relocation of structures subject to repetitive flooding. The majority (est. 67 percent) of existing residential and commercial structures in the area are constructed on slab foundation. Subdivisions in this watershed are not densely congested and are spaciously developed. Ring levees around selected subdivision could be economically favorable buy-out relocation were evaluated in conjunction with other flood proofing techniques. Preliminary cost data indicated the cost per (flooded) structure for nonstructural measures were significantly higher than the cost per structure associated with channel modification alternatives. No nonstructural alternatives were, therefore, included in the analysis of initial plans.

TABLE 35

BEAVER BAYOU - INITIAL ALTERNATIVE PLAN SUMMARY

ALTERNATIVE PLAN	DESCRIPTION
BBN-P1	10-Year Earthen Channel Without Tributaries
BBN-P2	25-Year Earthen Channel Without Tributaries
BBN-P3	50-Year Earthen Channel Without Tributaries
BBC-P4	10-Year Concrete-Lined Channel Without Tributaries
BBN-P5	Minimum Clearing and Snagging of the Main Channel
--	No Action

Source: U.S. Army Corps of Engineers, New Orleans District

TABLE 36

BEAVER BAYOU - INITIAL ALTERNATIVE PLANS

PLAN	CHANNEL	BOTTOM WIDTH	LOCATION
BBN-P1			
	Beaver Bayou	varies	Improvements from Frenchtown Road to Hubbs Road. 10-year earthen channel design.
		20'BW	Frenchtown Road to Greenwell Springs Road.
		50'BW	Greenwell Springs to Wax Road.
		improve bridge	Wax Road (lengthen 96 feet).
		30'BW	Wax Road to Hooper Road.
		20'BW	Hooper Road to Denham Road.
		5'BW	Denham Road to Hubbs Road.
	Lateral Trib.		No Work.
	Tributary #2		No Work.
BBN-P2			
	Beaver Bayou		Improvements from Frenchtown Road to Hubbs Road. 25-year earthen channel design.
		20'BW	Frenchtown Road to 2300' d/s Greenwell Springs Road.
		50'BW	2300' d/s Greenwell Springs Road to Greenwell Springs Road.
		improve bridge	Greenwell Springs Road (lengthen 90 feet).
		50'BW	Greenwell Springs to Wax Road.
		improve bridge	Wax Road (lengthen 115 feet).
		50'BW	Wax Road to Hooper Road.
		30'BW	Hooper Road to Denham Road.
		5'BW	Denham Road to Hubbs Road.
	Lateral Trib.		No Work.
	Tributary #2		No Work.

TABLE 36 (CONTINUED)

BEAVER BAYOU - INITIAL ALTERNATIVE PLANS

PLAN	CHANNEL	BOTTOM WIDTH	LOCATION
BBN-P3			
	Beaver Bayou	varies	Improvements from Frenchtown Road to Hubbs Road. 50-year earthen channel design.
		20'BW	Frenchtown Road to 2300' d/s Greenwell Springs Road.
		50'BW	2300' d/s Greenwell Springs Road to Greenwell Springs Road.
		improve bridge	Greenwell Springs Road (lengthen 90 feet).
		50'BW	Greenwell Springs to Wax Road.
		improve bridge	Wax Road (lengthen 115 feet).
		50'BW	Wax Road to Hooper Road.
		improve bridge	Hooper Road (lengthen 94 feet).
		40'BW	Hooper Road to Denham Road.
		5'BW	Denham Road to Hubbs Road.
	Lateral Trib.		No Work.
	Tributary #2		No Work.
BBC-P4			
	Beaver Bayou	varies	Improvements from Frenchtown Road to Hubbs Road. Minimum concrete-lined channel design.
		20'BW	(earthen channel) Frenchtown Road to 2300' d/s Greenwell Springs Road.
		10'BW	2300' d/s Greenwell Springs Road to Greenwell Springs Road.
		10'BW	Greenwell Springs Road to Wax Road.
		10'BW	Wax Road to Hooper Road.
		5'BW	Hooper Road to Denham Road.
		5'BW	Denham Road to Hubbs Road.
	Lateral Trib.		No Work.
	Tributary #2		No Work.

TABLE 36 (CONTINUED)

BEAVER BAYOU - INITIAL ALTERNATIVE PLANS

PLAN	CHANNEL	BOTTOM WIDTH	LOCATION
BBN-P5			
	Beaver Bayou	N/A	Frenchtown to Hubbs Road-clearing and snagging.
	Lateral Trib		No Work
	Tributary #2		No Work

NOTE: All earthen channel design embankment slopes 3.5 H : 1.0 V; All concrete design slopes 3.0 H : 1.0 V

Source: U.S. Army Corps of Engineers, New Orleans District

Screening of Initial Alternative Plans

In this iteration, only major cost items - construction, relocations, real estate, and annual operations and maintenance were developed. Benefits calculated in this part of the analyses were "direct" property inundation flood damage reductions plus an estimated percentage (20%) of "indirect" flood damage reduction benefits. "Indirect" items include such items as public agency emergency costs, flood insurance reductions, and lower construction costs within the floodplain.

Cost-benefit calculations for each alternative plan are shown in Table 37. A period of 50 years and an annual interest rate of 8.00% were used to calculate equivalent annual values. Costs and benefits shown are all relative to the base condition or "No Action" Plan. No mitigation cost was considered in the initial screening. However, methods to avoid adverse environmental impacts and mitigation measures were considered in plan formulation. It should be noted that costs and benefits were not calculated for Plan BBN-P5, clearing and snagging of the main channel. Initial hydraulic analysis indicated that only minimal stage lowerings could be achieved and that flood reduction benefits would be minimal. No further analysis was done on this plan since it was determined that it would not be a comprehensive solution to flood damage in this watershed.

The cost-benefit calculations revealed that all earthen and concrete-lined channel modification alternatives have significantly higher net benefits relative to base conditions. Relative to the concrete-lined channel alternative, all earthen channel plans were determined to have both significantly higher net benefits and lower first costs. The concrete-lined channel alternative was therefore eliminated. The minimum clearing and snagging plan was determined to have limited net benefits and was also eliminated at this point of the analyses. Earthen channel alternatives were determined to have net benefits within 25 percent and were all selected for futher evaluation.

Analysis of Final Alternative Plans

Plans selected for final analyses are:

BBN-P1 10-Year Earthen Channel

BBN-P2 25-Year Earthen Channel

BBN-P3 50-Year Earthen Channel

NO ACTION

Since no alteration was made to either plan, details shown in the Initial Alternative Plans are the same. Final alternative plans were evaluated relative to National Economic Development, Environmental Quality, Regional Economic Development, and Social Effects. A summary of this analyses is shown in Table 38.

TABLE 37

BEAVER BAYOU
ECONOMIC ANALYSIS OF INITIAL ALTERNATIVE PLANS

PLAN	FIRST COST	ANNUAL COST	INUNDATION REDUCTION BENEFITS	NET BENEFITS	B/C RATIO
BBN-P1	$12,060,000	$1,049,000	$6,081,000	$5,032,000	5.8
BBN-P2	$14,893,000	$1,290,000	$7,154,000	$5,864,000	5.5
BBN-P3	$16,317,000	$1,411,000	$7,209,000	$5,798,000	5.1
BBC-P4	$25,379,000	$2,252,000	$6,979,000	$4,727,000	3.01
BBN-P5	N/A	N/A	N/A	N/A	N/A

SOURCE: U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT

National Economic Development (NED)

In the final analyses, environmental mitigation costs were were included in each alternative plan's cost. It should be noted that the mitigation plan combines all mitigation requirements from all watersheds. Consolidating mitigation sites was determined to be far more practical than establishing individual mitigation sites for each watershed in the study area. Costs were prorated to each watershed based on alternative plan wooded habitat losses.

Alternative plan benefits and costs are listed in Table 38. As in the initial screening, a period of 50 years and 8.00% annual interest were used. Of the three earthen channel modification alternatives BBN-P2, the 25-year channel design plan, has the highest net economic benefits at $5,800,000 per year. This is about 20 percent higher than Alternative BBN-P1, the 10-year plan at $4,966,000 per year. There is apparently only a marginal difference in net economic benefits between BBN-P2 and BBN-P3, the 50-year channel design plan. This difference is well within relative uncertainty margins. The lower first cost of Alternative BBN-P2 does, however, give it a relative advantage to BBN-P3 in this category.

Environmental Quality

Impacts on the following environmental factors were evaluated for each final alternative plan:

- Agricultural Lands
- Forestlands
- Threatened and Endangered Species
- Aquatic Resources and Water Quality
- Sedimentation
- Air Quality
- Historic Places
- Cultural Properties

Detailed analyses of these factors can be found in the Environmental Appendix (E) and the Environmental Impact Statement. Impacts are listed in summary in Table 38.

TABLE 38
BEAVER BAYOU FINAL ALTERNATIVES SUMMARY OF COMPARATIVE ITEMS

ITEM	BBN-P1	BBN-P2 (TENTATIVELY SELECTED PLAN)	BBN-P3
I. PLAN DESCRIPTION	10-YEAR EARTHEN CHANNEL	25-YEAR EARTHEN CHANNEL	50-YEAR EARTHEN CHANNEL
II. NATIONAL ECONOMIC DEVELOPMENT			
A. PROJECT FIRST COST	$12,756,000	$15,577,000	$17,025,000
B. O&M COST	$ 31,000	$ 31,000	$ 31,000
C. TOTAL AVERAGE ANNUAL COSTS	$ 1,115,000	$ 1,354,000	$ 1,477,000
D. TOTAL AVERAGE ANNUAL BENEFITS	$ 6,081,000	$ 7,154,000	$ 7,209,000
E. NET ANNUAL BENEFITS	$ 4,966,000	$ 5,800,000	$ 5,732,000
F. BENEFIT-COST RATIO	5.45	5.28	4.88
III. ENVIRONMENTAL QUALITY			
A. AGRICULTURAL LANDS	125 ACRES DIRECTLY IMPACTED BY FOREST REPLANTING	122 ACRES DIRECTLY IMPACTED BY FOREST REPLANTING	127 ACRES DIRECTLY BY FOREST REPLANTING
B. FORESTLANDS	88 ACRES AFFECTED BY PROJECT; 125 ACRES WOULD BE CREATED BE CREATED VIA MITIGATION	86 ACRES AFFECTED BY PROJECT; 122 ACRES WOULD BE CREATED BE CREATED VIA MITIGATION	89 ACRES AFFECTED BY PROJECT; 127 ACRES WOULD BE CREATED VIA MITIGATION
C. THREATENED & ENDANGERED SPECIES	NONE AFFECTED	NONE AFFECTED	NONE AFFECTED
D. AQUATIC RESOURCES & WATER QUALITY	SHORT-TERM ADVERSE IMPACT DURING CONSTRUCTION; LONG-TERM EFFECTS MINOR	(SAME AS BBN-P1)	(SAME AS BBN-P1)

TABLE 38 (CONTINUED)
BEAVER BAYOU FINAL ALTERNATIVES SUMMARY OF COMPARATIVE ITEMS

ITEM	BBN-P1	BBN-P2 (TSP)	BBN-P3
E. SEDIMENTATION	PROJECT WILL REDUCE STREAMBANK EROSION; LARGER CHANNEL WILL CAUSE SLIGHT INCREASE IN DEPOSITION	(SAME AS BBN-P1; SLIGHTLY WORSE)	(SAME AS BBN-P1; SLIGHTLY WORSE)
F. AIR QUALITY	MINOR SHORT-TERM IMPACTS DURING CONSTRUCTION	(SAME AS BBN-P1)	(SAME AS BBN-P1)
G. NATIONAL REGISTER OF HISTORIC PLACES	NO IMPACT	NO IMPACT	NO IMPACT
H. CULTURAL PROPERTIES	VERY SLIGHT CHANCE OF UNCOVERING UNKNOWN SITES DURING CONSTRUCTION	(SAME AS BBN-P1)	(SAME AS BBN-P1)
IV. <u>REGIONAL ECONOMIC DEVELOPMENT</u>			
A. REGIONAL INCOME AND EMPLOYMENT	IMPROVED VALUE WILL LIKELY FACILITATE URBAN GROWTH	(SAME AS BBN-P1; SLIGHTLY BETTER)	(SAME AS BBN-P1; SLIGHTLY BETTER)
B. REGIONAL GROWTH AND BUSINESS ACTIVITY	INCREASED EMPLOYMENT FOR CONSTRUCTION; BETTER ECONOMIC CLIMATE DUE TO REDUCTION IN FLOOD THREAT	(SAME AS BBN-P1; SLIGHTLY BETTER)	(SAME AS BBN-P1; SLIGHTLY BETTER)
C. TAX REVENUE	IMPROVED FLOOD PROTECTION WILL STABILIZE TAX BASE	(SAME AS BBN-P1; SLIGHTLY BETTER)	(SAME AS BBN-P1; SLIGHTLY BETTER)
D. PROPERTY VALUE	IMPROVED FLOOD PROTECTION WILL LIKELY STABILIZE OR RAISE PROPERTY VALUES	(SAME AS BBN-P1; SLIGHTLY BETTER)	(SAME AS BBN-P1; SLIGHTLY BETTER)

TABLE 38 (CONTINUED)
BEAVER BAYOU FINAL ALTERNATIVES SUMMARY OF COMPARATIVE ITEMS

ITEM	BBN-P1	BBN-P2 (TSP)	BBN-P3
V. OTHER SOCIAL EFFECTS			
A. URBAN AND COMMUNITY IMPACTS	POSITIVE IMPACTS DUE TO IMPROVED FLOOD PROTECTION	(SAME AS BBN-P1; SLIGHTLY BETTER)	(SAME AS BBN-P1; SLIGHTLY BETTER)
B. LIFE, HEALTH, AND SAFETY	THREAT TO LIFE, HEALTH, AND SAFETY REDUCED	(SAME AS BBN-P1; SLIGHTLY BETTER)	(SAME AS BBN-P1; SLIGHTLY BETTER)
C. DISPLACEMENT	SOME TAKING OF UNIMPROVED PRIVATE PROPERTY; 110 acres	(SAME AS BBN-P1; SLIGHTLY WORSE, 115 acres)	(SAME AS BBN-P1; SLIGHTLY WORSE, 120 acres)
D. LONG-TERM PRODUCTIVITY	POSITIVE IMPACT DUE TO REDUCED FLOOD THREAT	(SAME AS BBN-P1; SLIGHTLY BETTER)	(SAME AS BBN-P1; SLIGHTLY BETTER)
E. LEISURE	NO IMPACT	NO IMPACT	NO IMPACT
F. AESTHETIC	SOME ADVERSE IMPACT BY REMOVING TREES FROM CHANNELS; MITIGATED WITH REPLANTED TREE LINE	(SAME AS BBN-P1)	(SAME AS BBN-P1)
G. COMMUNITY COHESION	PRESERVED DUE TO REDUCED FLOOD THREAT	(SAME AS BBN-P1; SLIGHTLY BETTER)	(SAME AS BBN-P1; SLIGHTLY BETTER)
H. COMMUNITY GROWTH	POSITIVE IMPACT DUE TO REDUCED FLOOD THREAT	(SAME AS BBN-P1; SLIGHTLY BETTER)	(SAME AS BBN-P1; SLIGHTLY BETTER)
I. TRANSPORTATION	MINOR DISRUPTION DURING CONSTRUCTION; IMPROVED SITUATION BY REDUCING FLOODING	(SAME AS BBN-P1; SLIGHTLY BETTER)	(SAME AS BBN-P1; SLIGHTLY BETTER)
J. NOISE	MINOR INCREASE IN NOISE DURING CONSTRUCTION	(SAME AS BBN-P1)	(SAME AS BBN-P1)
K. QUALITY OF LIFE	REDUCED FLOODING WILL SUBSTANTIALLY IMPROVE THE QUALITY OF LIFE FOR THOSE AFFECTED	(SAME AS BBN-P1; SLIGHTLY BETTER)	(SAME AS BBN-P1; SLIGHTLY BETTER)

TABLE 38 (CONTINUED)
BEAVER BAYOU FINAL ALTERNATIVES SUMMARY OF COMPARATIVE ITEMS

ITEM	NO ACTION
I. PLAN DESCRIPTION	
II. NATIONAL ECONOMIC DEVELOPMENT	
A. PROJECT FIRST COST	$ 0
B. O&M COST	$ 0
C. TOTAL AVERAGE ANNUAL COSTS	$ 0
D. TOTAL AVERAGE ANNUAL BENEFITS	$ 0
E. NET ANNUAL BENEFITS	$ 0
F. BENEFIT-COST RATIO	N/A
III. ENVIRONMENTAL QUALITY	
A. AGRICULTURAL LANDS	SOME ADVERSE IMPACT DUE TO RECURRING FLOODING
B. FORESTLANDS	MINOR LOSS TO DEVELOPMENT
C. THREATENED AND ENDANGERED SPECIES	NONE AFFECTED
D. AQUATIC RESOURCES AND WATER QUALITY	NO IMPACT
E. SEDIMENTATION	NO IMPACT
F. AIR QUALITY	NO IMPACT
G. NATIONAL REGISTER OF HISTORIC PLACES	NO IMPACT

TABLE 38 (CONTINUED)
BEAVER BAYOU FINAL ALTERNATIVES SUMMARY OF COMPARATIVE ITEMS

ITEM	NO ACTION
H. CULTURAL PROPERTIES	NO IMPACT
IV. REGIONAL ECONOMIC DEVELOPMENT	
A. REGIONAL INCOME AND EMPLOYMENT	INCOME AND BUSINESS MAY BE REDUCED DUE TO RECURRING FLOODING
B. REGIONAL GROWTH AND BUSINESS ACTIVITY	INCOME AND BUSINESS MAY BE REDUCED DUE TO RECURRING FLOODING
C. TAX REVENUE	INCOME AND BUSINESS MAY BE REDUCED DUE TO RECURRING FLOODING
D. PROPERTY VALUE	PROPERTY VALUES MAY DECLINE DUE TO RECURRING FLOODING
V. OTHER SOCIAL EFFECTS	
A. URBAN AND COMMUNITY IMPACTS	ADVERSE IMPACTS DUE TO FLOOD THREAT
B. LIFE, HEALTH, AND SAFETY	RECURRING FLOODS THREATEN LIFE, HEALTH, AND SAFETY
C. DISPLACEMENT	NO IMPACT
D. LONG-TERM PRODUCTIVITY	ADVERSE IMPACTS DUE TO FLOOD THREAT
E. LEISURE	NO IMPACT
F. AESTHETIC	NO IMPACT
G. COMMUNITY COHESION	ADVERSE IMPACTS DUE TO FLOOD THREAT
H. COMMUNITY GROWTH	ADVERSE IMPACTS DUE TO FLOOD THREAT

TABLE 38 (CONTINUED)
BEAVER BAYOU FINAL ALTERNATIVES SUMMARY OF COMPARATIVE ITEMS

ITEM	NO ACTION
I. TRANSPORTATION	SOME ADVERSE IMPACTS DURING FLOOD EVENTS
J. NOISE	NO IMPACT
K. QUALITY OF LIFE	ADVERSE IMPACTS FOR THOSE AFFECTED BY FLOODING

SOURCE: U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT

The only and long-lasting environmental impacts produced by the final alternative plans affect agricultural lands and forestlands. All channel modification plans directly impact forestlands. This in turn indirectly impacts agricultural lands as they are proposed to be converted to forestlands as mitigation for same. The loss of these agricultural land acres is not considered to be significant for this area. Flood stage lowerings associated with all channel modification alternatives reduce the size of the 100-year floodplain.

There is very little difference in the quantity of affected agricultural and forest lands for each of the channel modification plans. Therefore, there is no relative advantage for any plan in this category.

Regional Economic Development

Reducing flood damage frequency and cost will improve economic growth, employment, property valuation, and tax revenue in the region. Conversely, allowing flooding to continue to occur could likely result in decreasing same. Direct economic benefits to existing property is included in the NED estimates above. Induced economic benefits are speculative to a large degree and are not calculated directly into the benefit-cost analysis. These items are addressed in the Economic Appendix H and are listed in summary in Table 38.

All proposed channel improvement plans will significantly reduce flooding frequency and cost and therefore are far preferable to No Action given economic development considerations. Benefit calculations indicate that both the 25-year and 50-year earthen channel plans have significantly higher economic benefits relative to the 10-year plan. Relative to one another, however, there is very little estimated economic benefit difference between the 25-year and 50-year plans. Based on the above, both Alternatives BBN-P2, 25-year earthen channel with tributaries, and, BBN-P3, 50-year earthen channel with tributaries have the highest rating in this category.

Social Effects

Social effects considered in evaluating each alternative plan are listed in Table 38. Health, safety, and the quality of community life will obviously be significantly improved by all channel modification plans. While no homes or businesses will be displaced, construction of any channel modification plan will, however, require the permanent taking of some private property. Almost all of the property required to be taken is either agricultural, pasture, rural, or vacant. This property loss will adversely impact the specific owners. Additionally, some minor traffic disruptions will occur in both plans in association with required bridge relocations.

Relative to No Action, the beneficial social impacts of all channel modification plans appear to far outweigh their adverse effects. The higher level of flood reduction associated with all the channel modification plans appear to outweigh their real estate and bridge relocation disadvantages.

Trade-Off Analyses and Plan Selection

The economic and social benefits of all channel improvement alternatives are far more significant than the slight environmental quality advantage of No Action. Both the 25-year (BBN-P2) and 50-year (BBN-P3) earthen channel alternatives have significant economic benefits relative to the 10-year (BBN-P1) channel plan. Relative to each other, there are no significant net economic, environmental, or social impact differences between BBN-P2 and BBN-P3, but, BBN-P2 does have a significantly lower first cost. Alternative BBN-P2, the 25-year earthen channel modification with tributaries, is therefore, the preferred structural alternative for this watershed.

Uncertainty ranges in such items as flood stage-frequencies, structure and content values, and project construction costs were not quantified in this part of the analyses. These potential uncertainties were, however, taken into consideration relative to each final alternative. It was determined that, for the most part, uncertainty ranges would affect each alternative in a similar way with a slightly

greater or lesser magnitude. Such effects would not likely change the relative advantages or disadvantages of each final alternative and, therefore, not affect the above plan selection.

Due to the presence of sandy soils in the area, the possibility exists that some erosion control measures will be needed on portions of any proposed channel enlargement. A system of geosynthetic fabric and rock would be proposed for these reaches. It is estimated that such a system would be rather costly at approximately over $800,000 per mile of channel.

Should erosion control measures be required, up to $6 million of cost could be added to any of the above considered channel modification plans. Relative to each other, there would be no net difference and plan BBN-P2 would still be the preferred plan. With erosion control measures on its entire length, this plan would still generate net benefits of approximately $5,250,000 per year and have a benefit to cost ratio of 3.8 to 1. Added cost of this magnitude would, however, make the economics of selected nonstructural measures comparable to this plan.

Comparison to Selected Nonstructural Measures

With the inclusion of proposed erosion control measures for the entire channel length, the preferred channel modification plan for this watershed exhibits a relatively high cost per structure in the affected floodplains. For this reason, selected nonstructural alternatives were revisited and evaluated in further detail.

Elevating residential structures in combination with constructing earthen ring levees around individual commercial structures was determined to be both the most practical and comprehensive nonstructural options for this watershed. While it may not be possible to elevate all residential structures, or ring levee every commercial structure, for the purposes of this analysis it was assumed that this could be accomplished for all affected structures.

Two options, elevating residential structures and installing ring levees around commercial structures in the 10-year and 25-year floodplains were evaluated. In both cases, structures would be elevated or protected up to the 100-year flood elevation plus one foot. (This elevation is consistent with the parish's ordinance on new construction).

Structures in the 10 and 25-year floodplains were identified and the required height of elevation or levee protection for each was calculated. Structures were grouped by this requirement and, for residential, by construction type (pier or slab). Table 39 and 40 list these structure groupings for the 10- and 25-year floodplains. Costs for these alternatives were determined from generalized estimates of elevating an average size house (1,750 square feet), given the height of raising and the type of construction. Ring levee costs were also based on a generalized approach of considering a 400-foot long levee around each commercial structure. Tables 31 and 32, respectively, illustrate these costs for residential structure raising and ring levee construction.

The cost of elevating/protecting all residential and commercial structures in the 10-year floodplain is estimated at \$21,770,000. This cost includes added contract administration (10%) and contingencies (20%). Implementation of elevating/protecting over 400 structures would take a relatively long period of time, an estimated four years. Thus, the estimated total gross investment cost of this plan (includes interest lost during construction) is \$25,487,000. The estimated first and gross investment costs for elevating/protecting approximately 530 structures in the 25-year floodplain are \$26,000,00 and \$30,439,000, respectively.

Flood damage reduction benefits were calculated for both the 10-year and 25-year floodplain structure elevation/protection plans. In both cases, flood damage reductions would be quite extensive. For the 10-year plan approximately 85%, or \$7,448,000 per year, of all flood damages would be eliminated in the entire watershed. This value increases to 94%, or \$8,230,000 per year, for the 25-year nonstructural plan.

At 8 percent interest rate over a 50-year period, the net economic benefits for the 10-year plan are estimated at $5,365,000 per year with a benefit-to-cost ratio of 3.6 to 1. Estimates net economic benefits for the 25-year plan are estimated at $5,742,000 per year with a benefit to cost ratio of 3.3 to 1. Based on this analysis, elevating/protecting all structures in the 25-year floodplain is the more feasible nonstructural alternative for this watershed.

In comparison to the preferred structural plan, with maximum erosion control measures, the 25-year nonstructural plan has slightly higher calculated net economic benefits. Several important factors, however, do not make this plan preferable to the channel modification plan. First, the maximum cost of the channel modification plan includes erosion control measures for the proposed entire 8-mile length of project. While it will not be determined until extensive soil borings are taken during preconstruction design, it is expected that these measures will not be needed for a large portion of the project area. If only 50 percent of the erosion control items are needed, the first cost of this plan will be reduced by approximately 3 million dollars. This expected first cost reduction, if realized, increases this plan's net economic benefits to a much higher level than the nonstructural plan.

Therefore, the 25-year channel modification is preferable relative to nonstructural measures and is the tentatively selected plan for this watershed.

TABLE 39

BEAVER BAYOU - ESTIMATED NUMBER OF STRUCTURES, TYPE OF CONSTRUCTION AND RAISING REQUIREMENTS FOR THE 10-YEAR FLOODPLAIN

RESIDENTIAL STRUCTURES

HEIGHT TO BE RAISED (FT)*	NUMBER OF STRUCTURES	ESTIMATED NUMBER OF SLAB STRUCTURES	ESTIMATED NUMBER OF PIER STRUCTURES
2.5 - 3.5	95	64	31
3.5 - 4.5	203	136	67
4.5 - 5.5	36	24	12
5.5 - 6.5	0	0	0
>6.5	1	1	0
TOTAL	335	225	110

COMMERCIAL STRUCTURES

REQUIRED RING LEVEE HEIGHT (FT)*	NUMBER OF STRUCTURES
2.5 - 3.5	0
3.5 - 4.5	42
4.5 - 5.5	36
5.5 - 6.5	17
>6.5	0
TOTAL	94

* REQUIRED TO PROTECT STRUCTURE UP TO THE 100-YEAR FLOOD PLUS ONE FOOT.

TABLE 40

BEAVER BAYOU - ESTIMATED NUMBER OF STRUCTURES, TYPE OF CONSTRUCTION AND RAISING REQUIREMENTS FOR THE 25-YEAR FLOODPLAIN

RESIDENTIAL STRUCTURES

HEIGHT TO BE RAISED (FT)*	NUMBER OF STRUCTURES	ESTIMATED NUMBER OF SLAB STRUCTURES	ESTIMATED NUMBER OF PIER STRUCTURES
2.5 - 3.5	249	167	82
3.5 - 4.5	135	90	45
4.5 - 5.5	41	27	14
5.5 - 6.5	0	0	0
>6.5	1	1	0
TOTAL	426	285	141

COMMERCIAL STRUCTURES

REQUIRED RING LEVEE HEIGHT (FT)*	NUMBER OF STRUCTURES
2.5 - 3.5	0
3.5 - 4.5	76
4.5 - 5.5	15
5.5 - 6.5	10
>6.5	0
TOTAL	101

* REQUIRED TO PROTECT STRUCTURE UP TO THE 100-YEAR FLOOD PLUS ONE FOOT

JONES CREEK

The Jones Creek watershed is located in the eastern and southeastern portion of East Baton Rouge Parish. See Plate 2. Jones Creek is a tributary of the Amite River. Major tributaries of Jones Creek include Jones Creek Tributary, Lively Bayou, Lively Bayou Tributary, and Weiner Creek. Jones Creek and Tributaries drain about 26 square miles.

The Weiner Creek Tributary discharges into Jones Creek at about Mile 4.5. The stream has a drainage area of 2.8 square miles. Lively Bayou is the largest tributary to Jones Creek, with a drainage area of 6.0 square miles. Lively Bayou discharges into Jones Creek at about Mile 6.4. Its main tributary of Lively Bayou Tributary has a drainage area of 1.4 square miles which discharges into Lively Bayou about ½ mile above the mouth. Jones Creek Tributary enters Jones Creek at about Mile 9.8 and has a drainage area of 1.4 square miles.

The watershed is about 80 percent urbanized, consisting of residential and commercial development with some light industries. Land use maps for 1972 and 1985 are shown on Plates 6 through 13 of Appendix J. There are approximately 3,900 residential and commercial structures located within all flood zones in the watershed. The distribution of structures within the various floodplains is shown in Table 41. The approximate 10-year floodplain boundary is shown on Plate 6. Calculated without project equivalent annual flood damages for all subbasins in this watershed are listed in Table 42. Methods used in calculating these values can be found in Econimics Appendix H.

Flooding in this watershed is primarily headwater in nature. Some backwater problems occur, but only in close proximity to the confluence with the Amite River. Backwater flooding is not a significant factor in this watershed.

TABLE 41

JONES CREEK
DISTRIBUTION OF STRUCTURES WITHIN VARIOUS FLOODPLAINS

BASIN NO.	STRUCTURE CATEGORY	0-10 YEAR	10-25 YEAR	25-50 YEAR	50-100 YEAR	100-500 YEAR	ABOVE 500 YEAR	ALL FLOOD ZONES
	JONES CREEK WATERSHED							
	BASIN NAME: JONES CREEK							
22	1-STORY	57	28	123	92	141	1,062	1,503
	2-STORY	7	6	24	16	36	212	301
	MOBILE HOME	1	1	2	0	1	4	9
	COMMERCIAL	50	29	51	30	35	185	380
	TOTAL	115	64	200	138	213	1,463	2,193
	BASIN NAME: LIVELY BAYOU TRIBUTARY							
23	1-STORY	505	126	114	44	60	69	918
	2-STORY	20	10	4	3	5	13	55
	MOBILE HOME	0	0	0	0	0	0	0
	COMMERCIAL	2	1	0	0	0	0	3
	TOTAL	527	137	118	47	65	82	976
	BASIN NAME: LIVELY BAYOU							
24	1-STORY	116	55	64	24	78	101	438
	2-STORY	10	58	5	0	8	18	99
	MOBILE HOME	0	0	1	0	11	25	37
	COMMERCIAL	31	10	19	2	9	3	74
	TOTAL	157	123	89	26	106	147	648
	BASIN NAME: WEINER CREEK							
28	1-STORY	8	0	13	0	45	229	295
	2-STORY	0	0	0	2	4	36	42
	MOBILE HOME	0	0	0	0	0	1	1
	COMMERCIAL	0	0	1	0	0	21	22
	TOTAL	8	0	14	2	49	287	360

SOURCE: U.S. ARMY CORPS OF ENGINEERS

TABLE 42

JONES CREEK
CALCULATED WITHOUT PROJECT EQUIVALENT ANNUAL FLOOD DAMAGES

BASIN	REACH		EQUIVALENT ANNUAL DAMAGES WITHOUT PROJECT*
22 - JONES CREEK	A		$ 33,000
	B		$ 13,000
	C		$ 882,000
	D		$ 45,000
		SUBTOTAL	$ 973,000
23 - LIVELY BAYOU TRIBUTARY	O		$2,440,000
	P		$2,225,000
		SUBTOTAL	$4,665,000
24 - LIVELY BAYOU BASIN	L		$ 333,000
	M		$ 172,000
	N		$1,681,000
	N2		$ 145,000
		SUBTOTAL	$2,331,000
28 - WEINER CREEK	G		$ 3,000
	H		$ 0
	I		$ 77,000
		SUBTOTAL	$ 80,000
		TOTAL	$8,049,000

* 2ND QUARTER 1994 PRICE LEVELS

SOURCE: U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT

POSSIBLE OPTIONS TO REDUCE FLOOD DAMAGES

Structural Measures

Detention/Retention Storage

Detention storage was considered on Lively Bayou. The detention storage site was considered by the Baton Rouge Chamber of Commerce in a recent study. Hydraulic analysis indicates that detention storage would lower stages downstream for several miles. Additional channel modification would be required to provide lowering in the reaches where most of the structures are located. The lowerings provided by detention storage would be in reach of the bayou where about 200-300 structures exist. The detention storage would be located in a wooded area and clearing of those lands would be required to achieve the storage projected. Consequently, detention storage was eliminated from consideration. Detention storage would, however, provide opportunities to develop recreational facilities in the area.

Reservoirs in other locations throughout the watershed were also determined to be impractical due to excessive real estate and containment structure costs.

Channel Modifications

Channel modifications to the main stem and tributaries of Jones Creek were determined to be practical options and were investigated.

Several channel modification plans were developed for the Jones Creek and Tributaries watershed. Because the backwater effects of the Amite River extend from the mouth of Jones Creek to Jones Creek Road, channel modification in this reach was limited to clearing and snagging. In general, the plans were designed to contain headwater flows to within banks for the design frequencies. Initial designs considered widening the existing earthen channels to provide various levels of flood protection. Concrete lining in combination with less extensive channel widening was also considered. During the development of these alternatives, however, it became apparent that the combination of existing widespread highly erodible soils and

limited rights-of-way would limit the number of viable channel modification plans.

Throughout the Jones Creek watershed, particularly above the Weiner-Jones Creek confluence, bank erosion is prevalent. Erosion rates are moderately high and are extreme in numerous stream reaches. A significant strata of loess soil is widespread and is the main factor in this process. See Engineering Appendix C. There has also been extensive urban development along the right-of-way boundary in most stream reaches. This combination has resulted in a major problem where progressive bank erosion has encroached and affected private property lands, and is some cases, structures. Photographs illustrating this problem on Jones Creek can be found in Figure 1.

In consideration of the above, it was determined that channels could not be cleared or widened and maintained with just grass bank cover. Concrete-lined channels were, therefore, determined to be the only viable option for proposed channel modifications. Existing rights-of-way were also determined to be limited in numerous reaches. Since these lands are improved, extensive right-of-way buy out was not considered to be practical. Only minimal channel widening was therefore considered further.

Reshaping and concrete lining the existing channel, plus, slightly widening to within right-of-way limits and concrete lining were selected alternatives for further evaluation. Alternative combinations that include or exclude all tributaries were also considered. A "10-year" and "25-year" design designation was given to the concrete-lined alternative plans corresponding to the earthen sized channels. Actual performance of the concrete-lined channels is substantially greater.

Nonstructural Measures

There appears to be no practical or economical nonstructural solutions for the Jones Creek watershed, which is highly urbanized. Almost all existing residential and commercial structures in the area are constructed on concrete slab foundations. It would not be practical or economically

feasible to elevate a large number of structures above flood levels. Flood proofing by means of levees or floodwalls could not be accomplished in this congested area. Studies have shown that, where substantial numbers of structures are involved, buy out and relocation are considerably more costly than structural improvements providing comparable levels of flood damage reduction. Floodproofing individual structures requires analysis on a case-by-case basis. Because of the number of structures in the watershed, floodproofing individual structues was eliminated from consideration in this study. No non-structural plans were, therefore, developed for this watershed.

A summary of initial alternatives for Jones Creek is shown in Table 43. Alternative details are listed in Table 44. Alternatives are shown on Plates 16 and 17.

It was determined that significant environmental impacts of channel modification alternative plans would generally be limited to the destruction of some bottomland hardwood forests that occur in a linear strip along the channel banks. These impacts can be readily mitigated by reforestation of existing cleared lands or by protecting areas of existing forested lands.

Existing disposal areas were investigated to avoid adverse environmental impacts. The East Baton Rouge Parish of Public Works identified the parish landfill as the place to haul excavated material. Therefore, the initial cost estimates were developed assuming that excavated material would be hauled to this location. See Plate 51.

TABLE 43
JONES CREEK - INITIAL ALTERNATIVES SUMMARY

ALTERNATIVE	DESCRIPTION
JCCL-P1	10-Year Concrete-Lined Channel With Tributaries Lively Bayou, Lively Bayou Tributary, and Weiner Creek
JCCL-P2	25-Year Concrete-Lined Channel With Tributaries Lively Bayou, Lively Bayou Tributary, and Weiner Creek
JCCL-P3	10-Year Concrete-Lined Channel Without Tributaries
JCCL-P4	25-Year Concrete-Lined Channel Without Tributaries
--	No Action

NOTE: "Year" design not based on actual alternative performance; performance is significantly enhanced by concrete lining.

Source: U.S. Army Corps of Engineers, New Orleans District

TABLE 44

JONES CREEK - INITIAL ALTERNATIVE PLANS

PLAN	CHANNEL	BOTTOM WIDTH	LOCATION
JCCL-P1			
	Jones Creek	Clear & snag	Mouth to Jones Creek Road.
		5'BW	Jones Creek Road to Lobdell Blvd.
	Weiner Creek	5'BW	Mouth to Cedar Crest Ave.
	Lively Bayou	5'BW	Mouth to Illinois Central RR.
	Lively Bayou Trib	5'BW	Mouth to Tams Drive.
	Jones Creek Trib		No Work
JCCL-P2			
	Jones Creek	Clear & snag	Mouth to Jones Creek Road.
		10'BW	Jones Creek Road to S. Harrells Ferry Road
		15'BW	S. Harrells Ferry Road to Sherwood Forest Blvd.
		10'BW	Sherwood Forest Blvd. to Molly Lee Drive.
		15'BW	Molly Lee Drive to Sharp Rd.
		20'BW	Sharp Road to Cuyhanga Pkwy.
		5'BW	Cuyhanga Pkwy. to Lobdell Blvd.
	Weiner Creek	5'BW	Mouth to Sherwood Drive.
		30'BW	Sherwood Drive to Stanley Aubin Lane.
		20'BW	Stanley Aubin Lane to Cedar Crest Ave.
	Lively Bayou	20'BW	Mouth to Mile 2.3.
		30'BW	Mile 2.3 to Mile 3.2.
		35'BW	Mile 3.2 to Ill. Central RR.
	Lively Bayou Trib	5'BW	Mouth to Tams Drive.
	Jones Creek Trib		No Work
JCCL-P3			
	Jones Creek	Clear & snag	Mouth to Jones Creek Road.
		5'BW	Jones Creek Road to Lobdell Blvd.
	Weiner Creek		No Work.
	Lively Bayou		No Work.
	Lively Bayou Trib		No Work.
	Jones Creek Trib		No Work.

TABLE 44 (CONTINUED)

JONES CREEK - INITIAL ALTERNATIVE PLANS

PLAN	CHANNEL	BOTTOM WIDTH	LOCATION
JCCL-P4			
	Jones Creek	Clear & snag	Mouth to Jones Creek Road.
		10'BW	Jones Creek Road to S. Harrells Ferry Road.
		15'BW	S. Harrells Ferry Road to Sherwood Forest Blvd.
		10'BW	Sherwood Forest Blvd. to Molly Lee Drive.
		15'BW	Molly Lee Drive to Sharp Rd.
		20'BW	Sharp Rd. to Cuyhanga Pkwy.
		5'BW	Cuyhanga Pkwy. to Lobdell Blvd.
	Weiner Creek		No Work.
	Lively Bayou		No Work.
	Lively Bayou Trib		No Work.
	Jones Creek Trib		No Work.

NOTE: All concrete-lined embankment design slopes 3.0H : 1.0V

Source: U.S. Army Corps of Engineers, New Orleans District

Screening of Initial Alternatives

In this iteration, only major cost items - construction, relocations, real estate, and annual operations and maintenance were developed. Benefits calculated in this part of the analyses were "direct" property inundation flood damage reductions plus an estimated percentage (20%) of "indirect" flood damage reduction benefits. "Indirect" items include such items as public agency emergency costs, flood insurance reductions, and lower construction costs within the floodplain.

Cost-benefit calculations for each alternative plan are shown in Table 45. A period of 50 years and an annual interest rate of 8.00% were used to calculate equivalent annual values. Costs and benefits shown are all relative to the base condition or "No Action" Plan. No mitigation cost was considered in the initial screening. However, methods to avoid adverse environmental impacts were investigated and the plan revised accordingly as previously indicated.

TABLE 45

JONES CREEK
ECONOMIC ANALYSIS OF INITIAL ALTERNATIVE PLANS

PLAN	FIRST COST	ANNUAL COST	INUNDATION REDUCTION BENEFITS	NET BENEFITS	B/C RATIO
JCCL-P1	$49,570,000	$4,389,000	$6,715,000	$2,326,000	1.5
JCCL-P2	$66,275,000	$5,865,000	$6,727,000	$ 862,000	1.1
JCCL-P3	$36,795,000	$3,259,000	$4,877,000	$1,618,000	1.5
JCCL-P4	$38,208,000	$3,384,000	$4,877,000	$1,493,000	1.4

SOURCE: U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT

The cost-benefit calculations revealed that while all channel modification plans yield significant net benefits, there is virtually no additional benefits in widening the existing channels. This is true with and without the inclusion of the tributaries. Therefore, only the "10-year" plans, i.e., reshaping and concrete lining the existing channels without widening, were considered further. (Again, note that performance is significantly greater than "10-year").

At this point a cursory investigation of whether or not modification of each tributary incrementally yields net benefits was conducted. It was determined that the proposed channel modifications produce flood damage reductions in a widespread fashion throughout the watershed. Since channel design sections change little in each reach, project costs were determined to be relatively uniform per section throughout the watershed. Therefore, there appears to be relatively uniform incremental net benefits on all tributaries. Separate alternative analyses with all possible combinations of the four tributaries were therefore not initiated.

Analysis of Final Alternatives

Plans selected for final analyses were JCCL-P1, JCCL-P3, and No Action. Since no alteration was made to either plan, details shown in the Initial Alternative Plans are the same.

Final alternative plans were evaluated relative to National Economic Development, Environmental Quality, Regional Economic Development, and Social Effects. A summary of this analyses is shown in Table 46.

National Economic Development (NED)

In the final analyses, environmental mitigation costs were included in each alternative plan's cost. It should be noted that the mitigation plan combines all mitigation requirements from all watersheds. Consolidating mitigation sites was determined to be far more practical than establishing individual mitigation sites for each watershed in the study area. Costs were prorated to each watershed based on the amount of alternative plan habitat losses.

Alternative plan benefits and costs are listed in Table 46. As in the initial screening, a period of 50 years and 8.00% annual interest were used. Alternative JCCL-P1 (with tributaries) was determined to have the highest estimated net annual benefits of $2,285,000. This is significantly higher than the $1,583,000 per year of Plan JCCL-P3 (without tributaries). Both plans obviously have significant net economic benefits relative to No Action.

Environmental Quality

Impacts on the following environmental factors were evaluated for each final alternative plan:

- Agricultural Lands
- Forestlands
- Threatened and Endangered Species
- Aquatic Resources and Water Quality
- Sedimentation
- Air Quality
- Historic Places
- Cultural Properties

Detailed analyses of these factors can be found in the Environmental Appendix E and the Environmental Impact Statement. Impacts are listed in summary in Table 46.

The final alternative plans affect agricultural and forestlands. Both Alternative Plans JCCL-P1 and JCCL-P3 directly impact forestlands. This in turn indirectly impacts agricultural lands as they are proposed to be converted to forestlands as mitigation for same. The loss of these agricultural land acres is not considered to be significant for this area. Flood stage lowerings associated with Plans JCCL-P1 and JCCL-P3 reduce the size of the 100-year floodplain.

Plan JCCL-P3 (excluding tributaries) results in less conversion of woodlands and the subsequent less significant resultant conversion of agricultural lands via the mitigation plan, than does Plan JCCL-P1 (including tributaries). Therefore, from an environmental standpoint, Plan JCCL-P3 is the preferable action alternative.

Regional Economic Development

Reducing flood damage frequency and cost will improve economic growth, employment, property valuation, and tax revenue in the region. Conversely, allowing flooding to continue to occur could likely result in decreasing same. Direct economic benefits to existing property is included in the NED estimates above. Induced economic benefits are speculative to a large degree and are not calculated directly into the benefit-cost analysis. These items are addressed in the Economic Appendix H and are listed in summary in Table 46.

Both Plans, JCCL-P1 and JCCL-P3, will significantly reduce flooding frequency and cost and therefore are far preferable to No Action given economic development considerations. Relative to each other, construction of the 10-year concrete-lined channel with tributaries alternative plan, JCCL-P1, will result in less frequent flooding and lower flood damages versus JCCL-P3, which does not include the tributaries.

Social Effects

Social effects considered in evaluating each alternative plan are listed in Table 46. Health, safety, and the quality of community life will obviously be significantly improved by both channel modification plans. Relative to No Action, the beneficial social impacts of both channel modification plans

appear to far outweigh their adverse effects. The higher level of flood reduction associated with Plan JCCL-P1 is most preferable in this category.

Trade-Off Analyses and Plan Selection

The economic and social benefits of both channel modification alternative plans are far more significant than the slight environmental quality advantage of No Action. Relative to each other, Alternative Plan JCCL-P1 (with tributaries) has an advantage in NED, regional economic development and social effects. Plan JCCL-P3 (without tributaries) has a relative advantage with respect to environmental impacts.

The net economic benefits of Alternative Plan JCCL-P1 are significantly higher than JCCL-P3 and No Action. It is apparent that inclusion of all tributaries in the channel modification plan will produce significant economic benefits. In consideration of the possible effects of uncertainty factors, it appears that Plan JCCL-P1 would still have significant relative economic benefits. Alternative Plan JCCL-P1 (with tributaries) was therefore chosen as the Tentatively Selected Plan for this watershed.

TABLE 46
JONES CREEK FINAL ALTERNATIVES SUMMARY OF COMPARATIVE ITEMS

	ITEM	JCCP-P (TENTATIVELY SELECTED PLAN)	JCCL-P3	NO ACTION
I.	PLAN DESCRIPTION	10-YEAR CONCRETE-LINED CHANNEL WITH TRIBUTARIES; LIVELY BAYOU, LIVELY BAYOU TRIBUTARY, AND WEINER CREEK	10-YEAR CONCRETE-LINED CHANNEL WITHOUT TRIBUTARIES	
II.	NATIONAL ECONOMIC DEVELOPMENT			
	A. PROJECT FIRST COST	$50,141,000	$37,164,000	$0
	B. O&M COST	$ 15,000	$ 11,000	$0
	C. TOTAL AVERAGE ANNUAL COSTS	$ 4,430,000	$ 3,294,000	$0
	D. TOTAL AVERAGE ANNUAL BENEFIT	$ 6,715,000	$ 4,877,000	$0
	E. NET ANNUAL BENEFITS	$ 2,285,000	$ 1,583,000	$0
	F. BENEFIT-COST RATIO	1.52	1.48	N/A
III.	ENVIRONMENTAL QUALITY			
	A. AGRICULTURAL LANDS	99 ACRES INDIRECTLY IMPACTED BY FOREST REPLANTING	66 ACRES INDIRECTLY IMPACTED BY FOREST REPLANTING	NO IMPACTS
	B. FORESTLANDS	78 ACRES AFFECTED BY PROJECT; 99 ACRES WOULD BE CREATED VIA MITIGATION	52 ACRES AFFECTED BY PROJECT; 66 ACRES WOULD BE CREATED VIA MITIGATION	SOME LOSS OF THESE RESOURCES
	C. THREATENED AND ENDANGERED SPECIES	NONE AFFECTED	NONE AFFECTED	NONE AFFECTED
	D. AQUATIC RESOURCES AND WATER QUALITY	SHORT-TERM ADVERSE IMPACT DURING CONSTRUCTION; REDUCED DIVERSITY; INCREASED TEMPERATURES	(SAME AS JCCL-P1)	NO IMPACT

TABLE 46 (CONTINUED)
JONES CREEK FINAL ALTERNATIVES SUMMARY OF COMPARATIVE ITEMS

	ITEM	JCCL-P1 (TSP)	JCCL-P3	NO ACTION
	E. SEDIMENTATION	PROJECT WILL REDUCE STREAMBANK EROSION AND WILL SLIGHTLY IMPROVE SEDIMENTATION	(SAME AS JCCL-P1)	NATIVE SOILS RESULT IN HIGH AMOUNT OF EROSION
	F. AIR QUALITY	MINOR SHORT-TERM IMPACTS DURING CONSTRUCTION	(SAME AS JCCL-P1)	NO IMPACT
	G. NATIONAL REGISTER OF HISTORIC PLACES	NO IMPACT	NO IMPACT	NO IMPACT
	H. CULTURAL PROPERTIES	VERY SLIGHT CHANCE OF UNCOVERING UNKNOWN SITES DURING CONSTRUCTION	(SAME AS JCCL-P1)	NO IMPACT
IV.	<u>REGIONAL ECONOMIC DEVELOPMENT</u>			
	A. REGIONAL INCOME AND EMPLOYMENT	IMPROVED VALUE WILL LIKELY FACILITATE URBAN GROWTH	(SAME AS JCCL-P1; SLIGHTLY WORSE)	INCOME AND BUSINESS MAY BE REDUCED DUE TO RECURRING FLOODING
	B. REGIONAL GROWTH AND BUSINESS ACTIVITY	INCREASED EMPLOYMENT FOR CONSTRUCTION; BETTER ECONOMIC CLIMATE DUE TO REDUCTION IN FLOOD THREAT	(SAME AS JCCL-P1; SLIGHTLY WORSE)	INCOME AND BUSINESS MAY BE REDUCED DUE TO RECURRING FLOODING
	C. TAX REVENUE	IMPROVED FLOOD PROTECTION WILL STABILIZE TAX BASE	(SAME AS JCCL-P1; SLIGHTLY WORSE)	INCOME AND BUSINESS MAY BE REDUCED DUE TO RECURRING FLOODING
	D. PROPERTY VALUE	IMPROVED FLOOD PROTECTION WILL LIKELY STABILIZE OR RAISE PROPERTY VALUES	(SAME AS JCCL-P1; SLIGHTLY WORSE)	PROPERTY VALUES MAY DECLINE DUE TO RECURRING FLOODING

TABLE 46 (CONTINUED)
JONES CREEK FINAL ALTERNATIVES SUMMARY OF COMPARATIVE ITEMS

	ITEM	JCCL-P1 (TSP)	JCCL-P3	NO ACTION
V.	OTHER SOCIAL EFFECTS			
	A. URBAN AND COMMUNITY IMPACTS	POSITIVE IMPACTS DUE TO IMPROVED FLOOD PROTECTION	(SAME AS JCCL-P1; SLIGHTLY WORSE)	ADVERSE IMPACTS DUE TO FLOOD THREAT
	B. LIFE, HEALTH, AND SAFETY	THREAT TO LIFE, HEALTH, AND SAFETY REDUCED	(SAME AS JCCL-P1; SLIGHTLY WORSE)	RECURRING FLOODS THREATEN LIFE, HEALTH, AND SAFETY
	C. DISPLACEMENT	NONE EXPECTED	NONE EXPECTED	NO IMPACT
	D. LONG-TERM PRODUCTIVITY	POSITIVE IMPACT DUE TO REDUCED FLOOD THREAT	(SAME AS JCCL-P1; SLIGHTLY WORSE)	ADVERSE IMPACTS DUE TO FLOOD THREAT
	E. LEISURE	POTENTIAL FOR BIKE PATH RECREATION AS PART OF FLOOD CONTROL PROJECT	(SAME AS JCCL-P1; SLIGHTLY WORSE)	NO IMPACT
	F. AESTHETIC	SOME ADVERSE IMPACT BY REMOVING TREES FROM CHANNELS; MITIGATED WITH REPLANTED TREE LINE	(SAME AS JCCL-P1)	NO IMPACT
	G. COMMUNITY COHESION	PRESERVED DUE TO REDUCED FLOOD THREAT	(SAME AS JCCL-P1; SLIGHTLY WORSE)	ADVERSE IMPACTS DUE TO FLOOD THREAT
	H. COMMUNITY GROWTH	POSITIVE IMPACT DUE TO REDUCED FLOOD THREAT	(SAME AS JCCL-P1; SLIGHTLY WORSE)	ADVERSE IMPACTS DUE TO FLOOD THREAT
	I. TRANSPORTATION	MINOR DISRUPTION DURING CONSTRUCTION; IMPROVED SITUATION BY REDUCING FLOODING	(SAME AS JCCL-P1) DURING FLOOD EVENTS	SOME ADVERSE IMPACTS
	J. NOISE	MINOR INCREASE IN NOISE DURING CONSTRUCTION	(SAME AS JCCL-P1)	NO IMPACT
	K. QUALITY OF LIFE	REDUCED FLOODING WILL SUBSTANTIALLY IMPROVE THE QUALITY OF LIFE FOR THOSE AFFECTED	(SAME AS JCCL-P1; SLIGHTLY WORSE)	ADVERSE IMPACTS FOR THOSE AFFECTED BY FLOODING

SOURCE: U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT

CLAY CUT BAYOU

The Clay Cut Bayou Watershed is located in the southern part of the parish and generally flows west to east. See Plate 2. Clay Cut Bayou is a tributary of the Amite River and has one tributary - Jacks Bayou. This stream drains an area of about 15 square miles.

Land use in the watershed is about 50% urbanized. Land use maps for 1972 and 1985 are shown on Plates 14 and 15 of Appendix J. There are approximately 200 residential and commercial structures within the watershed. The distribution of structures within the various floodplains is shown in Table 47. The approximate 10-year floodplain boundary is shown on Plate 7. Calculated existing equivalent annual flood damages were estimated to be $1,015,000 per year in this watershed (Subbasin 31). Methodology used in calculating this figure can be found in the Economics Appendix H.

Both headwater and backwater flooding occurs in this watershed with the former predominant. Backwater flooding occurs from the bayou's mouth upstream to Elliot Road.

POSSIBLE OPTIONS TO REDUCE FLOOD DAMAGES

Structural Measures

Detention/Retention Storage

Due to the lack of topographical relief in this watershed, detention/retention storage basins were determined to be impractical. Required basin containment structures, primarily earthen levees, in conjunction with land requirements would be excessive in order to achieve significant flow retention.

Channel Modifications

As stated above, backwater effects of the Amite River extend upstream to Elliot Road. The existing channel utilizes all of the available right-of-way with a 25-foot servitude on each side of the channel. These limitations restricted the amount of channel modification that could be studied for this

channel to concrete lining of the existing channel with a minimum of shaping of the channel to a trapezoidal section. This modification extends from Elliot Road to Jacks Bayou. Recent modifications to Jack's Bayou have provided a 50-year level of protection. Therefore, no further channel modification was considered for Jacks Bayou. The benefit-to-cost ratio for the plan was to be 0.40 to 1. This plan was therefore not determined to be economically feasible.

As an alternative to concrete lining of the channel, channel enlargement by making a vertical cut at the top of banks was considered. This plan consisted of making a 3-foot deep gabion supported vertical cut at the top of banks. In addition, bank paving with gabions at a 1 on 3 sides slope extending from the toe of the vertical cut to a gabion-lined channel bottom was included in this plan. The gabions would be covered with an asphalt mastic to achieve Manning's 'n' value approximately equal to that of concrete. This option was determined to be slightly more costly than the concrete slope pavement and, therefore, was also determined to be infeasible.

Backwater Gate - Barrier Levee - Pumping Station

A culvert control structure and barrier levee located at the bayou's mouth was considered to reduce backwater flood damages. The first cost of this plan was determined to be in excess of $12.5 million. This cost, annualized, exceeds existing flood damage estimates for all of the watershed. Inclusion of a pumping station would substantially increase this cost further and would also be infeasible.

TABLE 47
CLAY CUT BAYOU - DISTRIBUTION OF STRUCTURES WITHIN VARIOUS FLOODPLAINS

BASIN NO.	STRUCTURE CATEGORY	0-10 YEAR	10-25 YEAR	25-50 YEAR	50-100 YEAR	100-500 YEAR	ABOVE 500 YEAR	ALL FLOOD ZONES
	SUBBASIN NAME: CLAYCUT BAYOU							
31	1-STORY	121	377	86	251	97	108	1040
	2-STORY	19	21	13	16	17	21	107
	MOBILE HOME	4	15	47	5	4	40	119
	COMMERCIAL	31	5	2	19	20	28	105
	TOTAL	175	418	148	291	138	197	1367

SOURCE: U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT

Nonstructural Measures

Nonstructural solutions for the Clay Cut Bayou area include ring levees around selected subdivisions, buy-out and relocation of structures subject to repetitive flooding. Almost all existing residential and commercial structures in the area are constructed on concrete slab foundation. Although technically possible, it is not usually practical or economically feasible to elevate a large number of structures above flood levels. Ring levees around selected subdivision could be economically favorable but is not feasible to provide protection to a large number of subdivisions. Buy-out and relocation was also determined to be more costly than structural improvements providing comparable levels of flood damage reduction. Floodproofing individual structures requires analysis on a case-by-case basis. Because of the number of structures in the watershed, floodproofing individual structures was eliminated from consideration in this study. No non-structural plans were, therefore, developed for this watershed.

No structural or nonstructural plan was determined to be economically feasible. Federal participation in a flood control project is therefore not recommended for this watershed.

WARD CREEK

The Ward Creek watershed is located in the central and southeastern portion of East Baton Rouge Parish. Ward Creek begins in the north central portion of Baton Rouge and flows in a southeasterly direction into Bayou Manchac. Major tributaries of Ward Creek include: Dawson Creek, Bayou Duplantier, and North Branch of Ward Creek. Ward Creek and Tributaries drain about 45 square miles.

Ward Creek, with a drainage area of about 45 square miles, is a major tributary of Bayou Manchac. It originates in the north-central portion of Baton Rouge and flows in a southerly direction changing to a southeasterly direction as it approaches the corporate limits. The floodplain is rather narrow within the city, but broadens quickly downstream of the corporate limits (see Plate 8). Ward Creek's major tributaries include North Branch Ward Creek and Dawson Creek and its tributary of Bayou Duplantier.

The North Branch Ward Creek Tributary has a drainage area of 7.8 square miles and discharges into Ward Creek at about Mile 7.8. It drains the eastern portion of the watershed. Dawson Creek is the largest tributary to Ward Creek with a drainage area of about 16.0 square miles. It discharges into Ward Creek at about Mile 5.8. Dawson Creek drains the western portion of the watershed. Bayou Duplantier is the main tributary to Dawson Creek with a drainage area of about 7.7 square miles. It discharges into Dawson Creek at about Mile 4.0 and drains the western portion of the Dawson Creek waters portion of the Dawson Creek watershed.

The watershed is about 75% urbanized, consisting of residential and commercial development with some light industries. Land use maps for 1972 and 1985 are shown on Plates 16 through 27 of Appendix J. There are approximately 5,400 residential and commercial structures within various floodplains in the watershed. The distribution of structures within these floodplains is shown in Table 48. The approximate 10-year floodplain boundary is shown on Plate 8. Calculated without project equivalent annual flood damages for all subbasins in this watershed are listed in Table 49.

Methodology used in calculating these values can be found in Economics Appendix H.

Flooding in this watershed is primarily headwater in nature. Some backwater problems occur, but only in close proximity to the confluence with Bayou Manchac. Backwater flooding is not a significant factor in this watershed.

TABLE 48

WARD CREEK - DISTRIBUTION OF STRUCTURES WITHIN VARIOUS FLOODPLAINS

BASIN NO.	STRUCTURE CATEGORY	0-10 YEAR	10-25 YEAR	25-50 YEAR	50-100 YEAR	100-500 YEAR	ABOVE 500 YEAR	ALL FLOOD ZONES
	BASIN NAME: WARD CREEK							
21	1-STORY	14	59	56	182	456	1,275	2,042
	2-STORY	1	0	5	2	3	25	38
	MOBILE HOME	0	0	0	0	1	0	1
	COMMERCIAL	3	13	17	48	91	220	392
	TOTAL	18	72	78	232	551	1,520	2,471
	BASIN NAME: BAYOU DUPLANTIER							
25	1-STORY	3	13	1	22	9	65	113
	2-STORY	2	6	6	6	6	15	41
	MOBILE HOME	0	0	0	0	0	0	0
	COMMERCIAL	12	2	2	4	13	13	46
	TOTAL	17	21	9	32	28	93	200
	BASIN NAME: DAWSON CREEK							
26	1-STORY	51	50	20	14	24	72	231
	2-STORY	10	5	3	1	1	9	29
	MOBILE HOME	0	0	0	0	0	0	0
	COMMERCIAL	52	50	11	17	15	64	209
	TOTAL	113	105	34	32	40	145	469
	BASIN NAME: NORTH BRANCH - WARD CREEK							
27	1-STORY	17	84	41	161	167	366	836
	2-STORY	3	18	1	21	61	45	149
	MOBILE HOME	0	0	0	0	0	0	0
	COMMERCIAL	23	16	14	9	19	233	314
	TOTAL	43	118	56	191	247	644	1,299

TABLE 48 (CONTINUED)

WARD CREEK - DISTRIBUTION OF STRUCTURES WITHIN VARIOUS FLOODPLAINS

BASIN NO.	STRUCTURE CATEGORY	0-10 YEAR	10-25 YEAR	25-50 YEAR	50-100 YEAR	100-500 YEAR	ABOVE 500 YEAR	ALL FLOOD ZONES
	BASIN NAME: DAWSON CREEK							
30	1-STORY	20	69	17	8	119	54	287
	2-STORY	0	2	2	10	18	19	51
	MOBILE HOME	0	0	0	0	0	0	0
	COMMERCIAL	19	20	3	5	12	82	141
	TOTAL	39	91	22	23	149	155	479
	BASIN NAME: WARD CREEK							
32	1-STORY	17	5	49	29	82	155	337
	2-STORY	3	2	3	2	2	15	27
	MOBILE HOME	4	0	0	0	1	71	76
	COMMERCIAL	25	4	19	15	2	13	78
	TOTAL	49	11	71	46	87	254	518

SOURCE: U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT

TABLE 49

WARD CREEK
CALCULATED WITHOUT PROJECT EQUIVALENT ANNUAL FLOOD DAMAGES

BASIN	REACH		EQUIVALENT ANNUAL DAMAGES WITHOUT PROJECT*
21 - WARD CREEK	B		$ 70,000
	C		$ 321,000
	D		$ 1,000
	E		$ 6,000
	F		$ 92,000
	G		$ 23,000
		SUBTOTAL	$ 513,000
25 - BAYOU DUPLANTIER	A		$ 227,000
26 - DAWSON CREEK	A		$ 835,000
27 - NORTH BRANCH - WARD CREEK	A		$ 446,000
	B		$ 126,000
	C		$ 210,000
		SUBTOTAL	$ 782,000
30 - DAWSON CREEK	A		$ 929,000
32 - WARD CREEK	A		$ 267,000
	B		$ 521,000
		SUBTOTAL	$ 788,000
TOTAL WATERSHED			$4,074,000

* 2ND QUARTER 1994 PRICE LEVELS

SOURCE: U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT

POSSIBLE OPTIONS TO REDUCE FLOOD DAMAGES

Structural Measures

Detention/Retention Storage

Because the upper portion of Ward Creek is so highly urbanized, the only opportunity for flood detention storage was on Bayou Duplantier. Hydraulic analysis indicated that providing detention storage on Bayou Duplantier would only lower states 0.3 feet. Consequently, detention storage was eliminated from consideration.

Channel Modifications

Channel modifications to the main stem and tributaries of Ward Creek were determined to be practical options and were investigated.

Several channel modification plans were developed for the Ward Creek and Tributaries watershed. Because the backwater effects of the Amite River extend from the mouth of Ward Creek to about 4,000 feet upstream, channel modifications in this reach were limited to clearing and snagging. In general, the channel modifications were sized to contain headwater flows to within banks for the design frequencies. Because Bayou Duplantier acts as a sump area, channel modification would not be effective. As such, no channel improvement designs were considered for this stream. All the stage lowerings on Bayou Duplantier are strictly dependent on downstream modification on Dawson Creek and Ward Creek.

Initial designs considered widening the existing earthen channels to provide various levels of flood protection. Concrete lining in combination with less extensive channel widening was also considered. During the development of these alternatives, however, it became apparent that the existence of widespread highly erodible soils would limit the number of viable channel modification plans.

Throughout the Ward Creek watershed, particularly above Siegen Lane, bank erosion is prevalent. Erosion rates are moderately high and are extreme in some locations. A

significant strata of loess soil is widespread and is the main factor in this process. See Engineering Appendix C. There has also been extensive urban development along the right-of-way boundary in some of these areas. This combination has resulted in a major problem where progressive bank erosion has encroached and affected private property lands, and is some cases, structures. This problem is severe in the North Branch Tributary. Photographs illustrating this problem on Ward Creek can be found in Figure 1.

In consideration of the above, it was determined that channels could not be widened and maintained with just grass bank cover. Concrete-lined channels were, therefore, determined to be the only viable option for proposed channel widenings.

Concrete-lined channel designs to contain storm events of 25, 50, and 100 years were determined to be possible for most of the watershed with the exception of the upper reaches of both the North Branch and Dawson Creek Tributaries where limited rights-of-way bordering developed areas exist. In these reaches, the existing right-of-way limit controlled the design. Alternative plan combinations that included or excluded all tributaries were also established.

Nonstructural Measures

Practical nonstructural solutions for the Ward Creek watershed are limited to buy out and relocation of floodplain properties susceptible to flooding. Almost all existing residential and commercial structures in the area are constructed on concrete slab foundations. Although technically possible, it is not usually practical or economically feasible to elevate a large number of structures above flood levels. Most residential structures are built on small subdivision lots making it difficult to construct levees or floodwalls between and around individual structures. In addition, such measures require careful attention to details of aesthetic appeal to avoid devaluation of the property. Such measures are often perceived as benefitting individual property owners rather than the general public. Prior studies involving areas of similar development have shown that, where substantial numbers of structures are involved, buy out and relocation is considerably

more costly than structural improvements providing comparable levels of flood damage reduction. Floodproofing individual structures requires analysis on a case-by-case basis. Because of the number of structures in the watershed, floodproofing individual structues was eliminated from consideration in this study. No non-structural plans were, therefore, developed for this watershed.

A summary of initial alternatives for Ward Creek is shown in Table 50. Detailed alternative plan descriptions are listed in Table 51. Alternative plans are shown on Plates 18 through 20.

It was determined that the significant environmental impacts of channel modification alternative plans would generally be limited to the destruction of some bottomland hardwood forests that occur in a linear strip along the channel banks. These impacts can be readily mitigated by reforestation of existing cleared lands or by protecting areas of existing forested lands.

Existing disposal areas were investigated to avoid the adverse environmental impact. The East Baton Rouge Parish of Public Works identified the parish landfill as the place to haul excavated material. Therefore, the initial cost estimates were developed assuming that excavated material would be hauled to this location. See Plate 51.

TABLE 50

WARD CREEK - SUMMARY OF INITIAL ALTERNATIVE PLANS

ALTERNATIVE	DESCRIPTION
WCC-P1	25-Year Concrete-Lined Channel Without Tributaries
WCC-P2	50-Year Concrete-Lined Channel Without Tributaries
WCC-P3	100-Year Concrete-Lined Channel Without Tributaries
WCC-P4	25-Year Concrete-Lined Channel With Tributaries; North Branch and Dawson Creek
WCC-P5	50-Year Concrete-Lined Channel With Tributaries; North Branch and Dawson Creek
WCC-P6	100-Year Concrete-Lined Channel With Tributaries; North Branch and Dawson Creek
--	No Action

Source: U.S. Army Corps of Engineers, New Orleans District

TABLE 51

WARD CREEK - INITIAL ALTERNATIVE PLANS

PLAN	CHANNEL	BOTTOM WIDTH	LOCATION
WCC-P1			
	Ward Creek	varies	4000′ upstream of mouth to the corporate limits. Based on the 25-year concrete-lined channel design.
		60′BW	4000′ u/s to Highland Road.
		50′BW	Highland to Barringer Foreman Rd.
		improve bridge	Barringer Foreman Road.
		80′BW	Barringer Foreman to 1000′ u/s I-10.
		60′BW	1000′ u/s I-10 to Pecue Lane.
		30′BW	Pecue to 3300′ d/s Bluebonnet.
		40′BW	3300′ d/s Bluebonnet to Bluebonnet.
		30′BW	Bluebonnet to 3000′ u/s of Bluebonnet.
		5′BW	3000′ u/s Bluebonnet to u/s Burden.
		30′BW	u/s Burden to u/s I-10.
		15′BW	u/s I-10 to corporate limits.
	Dawson Creek		No work.
	North Branch		No work.
WCC-P2			
	Ward Creek	varies	4000′ upstream to mouth to the corporate limits. Based on the 50-year concrete-lined channel design.
		80′BW	4000′ u/s to Barringer Foreman.
		improve bridge	Barringer Foreman Road.
		80′BW	Barringer Foreman to 1000′ u/s I-10.
		60′BW	1000′ u/s I-10 to 3000′ u/s of Bluebonnet.
		10′BW	3000′ u/s Bluebonnet to u/s Burden.
		30′BW	u/s Burden to u/s I-10.
		15′BW	u/s I-10 to corporate limits.

TABLE 51 (Continued)
WARD CREEK - INITIAL ALTERNATIVE PLANS

PLAN	CHANNEL	BOTTOM WIDTH	LOCATION
WCC-P2	**(Continued)**		
	Dawson Creek		No work.
	North Branch		No work.
WCC-P3			
	Ward Creek	varies	4000' upstream of mouth to the corporate limits. Based on the 100-year concrete-lined channel design.
		90'BW	4000' u/s to Barringer Foreman.
		improve bridge	Highland Road.
		improve bridge	Barringer Foreman Road.
		80'BW	Barringer Foreman to 1000' u/s I-10.
		70'BW	1000' u/s I-10 to 3000' u/s of Bluebonnet.
		40'BW	3000' u/s Bluebonnet to u/s Burden.
		30'BW	u/s Burden to u/s I-10.
		15'BW	u/s I-10 to corporate limits.
	Dawson Creek		No Work.
	North Branch		No Work.
WCC-P4			
	Ward Creek	varies	4000' upstream of mouth to the corporate limits. Based on the 25-year concrete-lined channel design.
		60'BW	4000' u/s to Highland Road.
		50'BW	Highland to Barringer Foreman Road.
		improve bridge	Barringer Foreman Road.
		80'BW	Barringer Foreman to 1000' u/s I-10.
		60'BW	1000' u/s I-10 to Pecue Lane.
		30'BW	Pecue to 3300' u/s Bluebonnet.
		40'BW	3300' d/s Bluebonnet to Bluebonnet.
		30'BW	Bluebonnet to 3000' d/s of Bluebonnet.

TABLE 51 (Continued)
WARD CREEK - INITIAL ALTERNATIVE PLANS

PLAN	CHANNEL	BOTTOM WIDTH	LOCATION
WCC-P4	**(Continued)**		
		5'BW	3000' d/s Bluebonnet to u/s Burden.
		30'BW	u/s Burden to u/s I-10.
		15'BW	u/s I-10 to corporate limits.
	Dawson Creek	20"BW	Mouth to College Drive.
		5'BW	College Drive to Hundred Oaks Drive.
	North Branch	20'BW	Mouth to Florida Blvd.
WCC-P5			
	Ward Creek	varies	4000' upstream of mouth to the corporate limits. Based on the 50-year concrete-lined channel design.
		80'BW	4000' u/s to Barringer Foreman.
		improve bridge	Barringer Foreman Road.
		80'BW	Barringer Foreman to 1000' u/s I-10.
		60'BW	1000' u/s I-10 to 3000' u/s of Bluebonnet.
		10'BW	3000' u/s Bluebonnet to u/s Burden.
		30'BW	u/s Burden to u/s I-10.
		15'BW	u/s I-10 to corporate limits.
	Dawson Creek	20'BW	Mouth to College Drive.
		5'BW	College Drive to Hundred Oaks Drive.
	North Branch	20'BW	Mouth to Florida Blvd.
WCC-P6			
	Ward Creek	varies	4000' upstream of mouth to the corporate limits. Based on the 100-year concrete-lined channel design. Modify Barringer Foreman and Highland Road bridges.
		90'BW	4000' u/s to Barringer Foreman Rd.
		improve bridge	Highland Road.
		improve bridge	Barringer Foreman Road.

TABLE 51 (Continued)
WARD CREEK - INITIAL ALTERNATIVE PLANS

PLAN	CHANNEL	BOTTOM WIDTH	LOCATION
WCC-P6	**(Continued)**		
		80'BW	Barringer Foreman to 1000' u/s I-10.
		70'BW	1000' u/s I-10 to 3000' u/s of Bluebonnet.
		40'BW	3000' u/s Bluebonnet to u/s Burden.
		30'BW	u/s Burden to u/s I-10.
		15'BW	u/s I-10 to corporate limits.
	Dawson Creek	20'BW	Mouth to College Drive.
		5'BW	College Drive to Hundred Oaks Drive.
	North Branch	20'BW	Mouth to Florida Blvd.

Note: All concrete-lined embankment design slopes 3.0H : 1.0V

Source: U.S. Army Corps of Engineers, New Orleans District

Screening of Initial Alternatives

Project costs, benefits, and potential adverse environmental impacts were used as the screening mechanisms. In this iteration, only major cost items - construction, relocations, real estate, and annual operations and maintenance were developed. Benefits calculated in this part of the analyses were "direct" property inundation flood damage reductions plus an estimated percentage (20%) of "indirect" flood damage reduction benefits. "Indirect" items include such items as public agency emergency costs, flood insurance reductions, and lower construction costs within the floodplain.

Cost-benefit calculations for each initial alternative plan are shown in Table 52. A period of 50 years and an annual interest rate of 8.00% were used to calculate equivalent annual values. Costs and benefits shown are all relative to the base condition or "No Action" Plan. No mitigation cost was considered in the initial screening. However, methods to avoid adverse environmental impacts and mitigation were considered in the plan formulation.

The cost-benefit calculations revealed that all six channel modification plans have costs that significantly exceed calculated benefits. Relative to each other, it was determined that there is no significant increase in benefits produced by the 50- or 100-year plans, both with and without inclusion of the tributaries.

Reformulation and Analyses of Alternative Plans

Reformulation of alternative plans was subsequently considered and two plans were developed. Each of these plans consists of concrete-lined 25-year designed channel for all tributaries and the main stem of Ward Creek only above Siegen Lane. One plan (WCC-P4A) includes minimal clearing and snagging downstream of Siegen Lane, while the other (WCC-P4B) includes the addition of replacing the Barringer Forman Road bridge with some channel widening immediately upstream and downstream of this crossing. In reformulating these plans, the replacement of the Siegen Lane bridge and downstream channel widening to 1200 feet above Pecue Lane were considered. These modifications have been recently constructed and were not considered in the screening of initial alternative plans. It was determined that these modifications have some significant effect on lowering flood stages in the lower Ward and lower Dawson Creeks' reaches. These effects were, therefore, incorporated into the without project conditions at this point of the analyses. Reformulated alternative plans are described in Table 53 and are shown on Plate 21.

TABLE 52

WARD CREEK - INITIAL ALTERNATIVE PLANS

CALCULATED BENEFITS AND COSTS

PLAN	FIRST COST	EQUIVALENT ANNUAL COST (INCLUDING O&M)	INUNDATION REDUCTION BENEFITS	NET BENEFITS	B/C RATIO
WCC-P1	$45,371,000	$4,350,000	$3,012,000	($1,338,000)	0.69
WCC-P2	$52,553,000	$5,037,000	$3,026,000	($2,011,000)	0.60
WCC-P3	$58,767,000	$5,632,000	$3,101,000	($2,531,000)	0.55
WCC-P4	$84,999,000	$8,144,000	$4,826,000	($3,318,000)	0.59
WCC-P5	$92,142,000	$8,828,000	$4,845,000	($3,983,000)	0.55
WCC-P6	$98,271,000	$9,414,000	$4,860,000	($4,554,000)	0.52

SOURCE: U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT

Cost-benefit calculations for the reformulated plans are shown in Table 54. As with the initial alternative plans, the two reformulation plans were also determined to have higher costs relative to their benefits produced.

At this point of the analysis, plans were further reformulated scaling down project size. Examination of flood reduction benefits and estimated costs for incremental reaches in Plans WCC-P4A and WCC-P4B indicated the following:

- Paving the main stem of Ward Creek would not be cost-effective; clearing and snagging the main stem of Ward Creek may be cost-effective.

- Relocation of the Barringer Foreman Road bridge would likely produce only marginal net benefits.

- Paving the lower reach of the North Branch Tributary below I-12 would likely be cost-effective; paving above I-12 would not likely be cost-effective.

- Paving the lower one-half of Dawson Creek up to Kenilworth Parkway may be cost-effective; paving above this point would not likely be cost-effective.

TABLE 53

WARD CREEK AND TRIBUTARIES
CHANNEL MODIFICATION ALTERNATIVES: WCC-P4A AND WCC-P4B

Stream	Reach	Type of Improvement
PLAN WCC-P4A -- Earthen and Concrete Improvements		
Ward Creek	Mouth to 4000 ft. upstream	No Work.
	4000 ft upstream to 1200 ft upstream Pecue Lane	Minimal Clearing and Snagging.
	1200 ft. upstream Pecue Lane to Siegen Lane	No Work: 150' BW by Developer made, Siegen Br replaced.
	Siegen Ln. to 3300 ft downstream of Bluebonnet Rd.	Concrete-Line: 30'BW, 1V on 3H SS
	3300 ft. downstream Bluebonnet Rd. to Bluebonnet Rd.	Concrete-Line: 40'BW, 1V on 3H SS
	Bluebonnet Rd. to I-10	Concrete-Line: 30'BW, 1V on 3H SS
	I-10 to corporate limits	Concrete-Line: 15'BW, 1V on 3H SS
	Corporate limits to Choctaw Drive	Clear Existing Concrete Channels
North Branch Ward Creek	Mouth to Florida Blvd	Concrete-Line: 20'BW, 1V on 3H SS
Dawson Creek	Mouth to College (Lee) Dr	Concrete-Line: 20'BW, 1V on 3H SS
	College Dr to Hundred Oaks Drive	Concrete-Line: 5'BW, 1V on 3H SS

TABLE 53 (Continued)

WARD CREEK AND TRIBUTARIES
CHANNEL MODIFICATION ALTERNATIVES: WCC-P4A AND WCC-P4B

Channel	Reach	Type of Improvement
PLAN WCC-P4B --	Earthen and Concrete Improvements	
Ward Creek	Mouth to 4000 ft upstream	No Work
	4000 ft upstream to Barringer Foreman Rd	Minimal Clearing and Snagging
	Barringer Foreman Road Bridge	Replace Bridge; Improve Channel Immediately u/s and d/s of Bridge
	Barringer Foreman Rd to 1200 ft u/s Pecue Ln	Minimal Clearing and Snagging
	1200 ft u/s Pecue Lane to Siegen Lane	No Work: 150' BW by Developer made, Siegen Br replaced
	Siegen Ln to 3300 ft d/s of Bluebonnet Rd	Concrete-Line: 30'BW, 1V on 3H SS
	3300 ft d/s Bluebonnet Rd to Bluebonnet Rd	Concrete-Line: 40'BW, 1V on 3H SS
	Bluebonnet Rd to I-10	Concrete-Line: 30'BW, 1V on 3H SS
	I-10 to corporate limits	Concrete-Line: 15'BW, 1V on 3H SS
	Corporate limits to Choctaw Drive	Clear Existing Concrete Channels
North Branch	Mouth to Florida Blvd	Concrete-Line: 20'BW, 1V on 3H SS
Dawson Creek	Mouth to College (Lee) Blvd	Concrete-Line: 20'BW, 1V on 3H SS
	College Dr to Hundred Oaks Drive	Concrete-Line: 5'BW, 1V on 3H SS

Source: U.S. Army Corps of Engineers, New Orleans District

TABLE 54

WARD CREEK - ECONOMIC ANALYSIS OF PLANS P4A AND P4B

PLAN	FIRST COST	ANNUAL COST	INUNDATION REDUCTION BENEFITS	NET BENEFITS	B/C RATIO
WCC-P4A	$66,100,000	$6,106,000	$2,294,000	($3,812,000)	0.38
WCC-P4B	$68,000,000	$6,280,000	$2,472,000	($3,808,000)	0.39

SOURCE: U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT

In consideration of the above, Plan WCC-P4B was eliminated and Plan WCC-P4A was further reformulated. Four plans (WCC-P4A1 - WCC-P4A4) incorporating the above were developed and are listed in Table 55 and are shown on Plates 22 and 23. These plans consist of paving the North Branch Tributary to I-12 along with the four combinations of clearing and snagging the main stem of Ward Creek to its termination at Choctaw Drive or partially up to the North Branch Tributary confluence, and, paving or not paving, Dawson Creek from its mouth to Kenilworth Parkway. At this point, plans for the North Branch Tributary were changed to incorporate an existing 1,200-foot paved reach between I-10 and I-12. This section has a 32-foot wide bottom width and the proposed section for North Branch was enlarged to match this reach.

Clearing and snagging of the Dawson Creek and North Branch Tributaries were not included. Unlike the main stem of Ward Creek, existing rights-of-way on these tributaries are limited with significant property development bordering the streambanks. Clearing and snagging may accelerate existing bank erosion in these tributaries and have significant adverse effects on the bordering properties.

TABLE 55
WARD CREEK ALTERNATIVE PLANS
WCC-P4A1 - WCC-P4A4

Stream	Reach	Type of Improvement
PLAN WCC-P4A1 -- Earthen and Concrete Improvements		
Ward Creek	Mouth to 4000 ft upstream	No Work
	4000 ft upstream to 1200 ft u/s Pecue Lane	Minimal Clearing and Snagging
	1200 ft u/s Pecue Lane to Siegen Lane	No Work; 150' BW by Developer made, Siegen Br replaced
	Siegen Lane to Choctaw Drive	Minimal Clearing and Snagging
North Branch Ward Creek	Mouth to I-12	Concrete-Line: 32" BW, 1V on 3H SS
	I-12 to Florida Blvd	No Work
Dawson Creek	Mouth to Kenilworth Blvd	Concrete-Line: 20' BW, 1V on 3H SS
	Kenilworth Blvd to Hundred Oaks Drive	No Work
Bayou Duplantier	Mouth to Darymple Drive	No Work
PLAN WCC-P4A2 -- Earthen and Concrete Improvements		
Ward Creek	Mouth to 4000 ft upstream	No Work
	4000 ft upstream to 1200 ft u/s Pecue Lane	Minimal Clearing and Snagging
	1200 ft u/s Pecue Lane to Siegen Lane	No Work: 150' BW by Developer made, Siegen Br replaced
	Siegen Ln to Choctaw Dr	Minimal Clearing and Snagging
North Branch Ward Creek	Mouth to I-12	Concrete-Line: 32' BW, 1V on 3H SS
	I-12 to Florida Blvd	No Work
Dawson Creek	Mouth to Kenilworth Blvd	No Work
	Kenilworth Blvd to Hundred Oaks Drive	No Work
Bayou Duplantier	Mouth to Darymple Drive	No Work

TABLE 55 (Continued)
WARD CREEK ALTERNATIVE PLANS
WCC-P4A1 - WCC-P4A4

Stream	Reach	Type of Improvement
PLAN WCC-P4A3 -- Earthen and Concrete Improvements		
Ward Creek	Mouth to 4000 ft upstream	No Work
	4000 ft upstream to 1200 ft u/s Pecue Lane	Minimal Clearing and Snagging
	1200 ft u/s Pecue Lane to Siegen Lane	No Work: 150′ BW by Developer made, Siegen Br replaced
	Siegen Ln to Mouth of North Br Ward Ck	Minimal Clearing and Snagging
	North Br Ward Ck to Choctaw Dr	No Work
North Branch Ward Creek	Mouth to I-12	Concrete-Line: 32′ BW, 1V on 3H SS
	I-12 to Florida Blvd	No Work
Dawson Creek	Mouth to Kenilworth Blvd	Concrete-Line: 20′ BW, 1V on 3H SS
	Kenilworth Blvd to Hundred Oaks Dr	No Work
Bayou Duplantier	Mouth to Darymple Drive	No Work
PLAN WCC-P4A4 -- Earthen and Concrete Improvements		
Ward Creek	Mouth to 4000 ft upstream	No Work
	4000 ft upstream to 1200 ft u/s Pecue Lane	Minimal Clearing and Snagging
	1200 ft u/s Pecue Lane to Siegen Lane	No Work: 150 BW by Developer made, Siegen Br replaced
	Siegen Ln to Mouth of North Br Ward Ck	Minimal Clearing and Snagging
	North Br Ward Ck to Choctaw Dr	No Work
North Branch Ward Creek	Mouth to I-12	Concrete-Line: 32′ BW, 1V on 3H SS
	I-12 to Florida Blvd	No Work

TABLE 55 (Continued)
WARD CREEK ALTERNATIVE PLANS
WCC-P4A1 - WCC-P4A4

Stream	Reach	Type of Improvement
PLAN WCC-P4A4 -- Earthen and Concrete Improvements (Continued)		
Dawson Creek	Mouth to Kenilworth Blvd	No Work
	Kenilworth Blvd to Hundred Oaks Dr	No Work
Bayou Duplantier	Mouth to Darymple Drive	No Work

Source: U.S. Army Corps of Engineers, New Orleans District

Flood reduction benefits were calculated for the above four plans. From these figures, it was clear from only a cursory estimate of incremental costs, that clearing and snagging all of the main stem of Ward Creek is cost-effective and that paving the lower one-half of Dawson Creek is not cost-effective.

In addition to these findings, consideration was given to the East Baton Rouge Parish Department of Public Works' interest in paving North Branch up to 1,800 feet above Old Hammond Highway where large interceptor channels flow into this tributary.

In consideration of the above, two plans were developed for further analysis. Each plan included minimal channel clearing and snagging of all of the main stem of Ward Creek. Plan WCC-P4A5 calls for paving the North Branch Tributary to I-12 only. Plan WCC-P4A6 includes paving North Branch to 1,800 feet above Hammond Highway. Plan details are listed in Table 56 and are shown on Plate 24.

TABLE 56

WARD CREEK - ALTERNATIVE PLANS

WCC-P4A5 AND WCC-P4A6

Stream	Reach	Type of Improvement
PLAN WCC-P4A5 -- Earthen and Concrete Improvements		
Ward Creek	Mouth to 4000 ft upstream	No Work
	4000 ft upstream to 1200 ft u/s Pecue Lane	Minimal Clearing and Snagging
	1200 ft u/s Pecue Lane to Siegen Lane	No Work; 150′ BW by Developer made, Siegen Br replaced
	Siegen Lane to Corporate Blvd	Minimal Clearing and Snagging
North Branch Ward Creek	Mouth to I-12	Concrete-Line: 32′ BW, 1V on 3H SS
	I-12 to Florida Blvd	No Work
Dawson Creek	Mouth to Bayou Duplantier	Minimal Clearing and Snagging
	Bayou Duplantier to Hundred Oaks Drive	No Work
Bayou Duplantier	Mouth to Darymple Drive	No Work
PLAN WCC-P4A6 -- Earthen and Concrete Improvements		
Ward Creek	Mouth to 4000 ft upstream	No Work
	4000 ft upstream to 1200 ft u/s Pecue Lane	Minimal Clearing and Snagging
	1200 ft u/s Pecue Lane to Siegen Lane	No Work: 150′ BW by Developer made, Siegen Br replaced
	Siegen Ln to Corporate Blvd	Minimal Clearing and Snagging
North Branch Ward Creek	Mouth to I-12	Concrete-Line: 32′ BW, 1V on 3H SS
	I-12 to 1800 ft u/s of Old Hammond Hwy	Concrete-Line: 20′ BW, 1V on 3H

TABLE 56 (Continued)

WARD CREEK - ALTERNATIVE PLANS

WCC-P4A5 AND WCC-P4A6

PLAN WCC-P4A6 -- Earthen and Concrete Improvements (Continued)

Stream	Reach	Type of Improvement
Dawson Creek	Mouth to Bayou Duplantier	Minimal Clearing and Snagging
	Bayou Duplantier to Hundred Oaks Drive	No Work
Bayou Duplantier	Mouth to Darymple Drive	No Work

Source: U.S. Army Corps of Engineers, New Orleans District

A detailed cost and flood reduction benefit analysis was performed on these two plans. The results of which are shown in Table 51. It was determined that only Plan WCC-P4A5 has positive net benefits. Plan WCC-P4A6 was not considered further.

TABLE 57
WARD CREEK - ECONOMIC ANALYSIS OF PLANS P4A5 AND P4A6

PLAN	FIRST COST	ANNUAL COST	INUNDATION REDUCTION BENEFITS	NET BENEFITS	B/C RATIO
WCC-P4A5	$ 9,434,000	$ 932,000	$1,032,000	$100,000	1.11
WCC-P4A6	$17,785,000	$1,704,000	$1,214,000	($490,000)	0.71

SOURCE: U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT

Analysis of Final Alternatives

Plans selected for final evaluation were: WCC-P4A5 (see description above) and No Action. Final alternative plans were evaluated relative to National Economic Development, Environmental Quality, Regional Economic Development, and Social Effects. A summary of this analyses is shown in Table 58.

National Economic Development (NED)

In the final analysis, environmental mitigation costs were included in each alternative plan's cost. It should be noted that the mitigation plan combines all mitigation requirements from all watersheds. Consolidating mitigation sites was determined to be far more practical than establishing individual mitigation sites for each watershed in the study area. Costs were prorated to each watershed based on alternative plan habitat losses. A complete description of the mitigation plan can be found in the Environmental Appendix (E).

Alternative plan benefits and costs are listed in Table 58. As in the initial screenings, a period of 50 years and 8.00% annual interest were used. Relative to No Action, the single channel modification plan, WCC-P4A5 has significant net economic development benefits relative to No Action.

Environmental Quality

Impacts on the following environmental factors were evaluated for each final alternative plan:

- Agricultural Lands
- Forestlands
- Threatened and Endangered Species
- Aquatic Resources and Water Quality
- Sedimentation
- Air Quality
- Historic Places
- Cultural Properties

Detailed analyses of these factors can be found in the Environmental Impact Statement and Appendix E. Impacts are listed in summary in Table 58.

The only environmental impacts produced by the final alternative plans affect agricultural lands and forestlands. Alternative Plan WCC-P4A5 directly impacts a significant quantity of forestlands. This in turn indirectly impacts agricultural lands as they are proposed to be converted to forestlands as mitigation for same. The loss of these agricultural land acres is not considered to be significant for

this area. Flood stage lowerings associated with Plan WCC-P4A5 reduces the size of the 100-year floodplain.

Plan WCC-P4A5 is the only action alternative included in the final array of alternatives. No other economically feasible action alternative was retained for comparison.

Regional Economic Development

Reducing flood damage frequency and cost will improve economic growth, employment, property valuation, and tax revenue in the region. Conversely, allowing flooding to continue to occur could likely result in decreasing same. Direct economic benefits to existing property is included in the NED estimates above. Induced economic benefits are speculative to a large degree and are not calculated directly into the benefit-cost analysis. These items are addressed in the Economic Appendix H and are listed in summary in Table 58.

Plan WCC-P4A5 will significantly reduce flooding frequency and cost and therefore is far preferable to No Action given economic development considerations.

Social Effects

Social effects considered in evaluating each alternative plan are listed in Table 58. Health, safety, and the quality of community life will obviously be significantly improved by the channel modification plan.

Trade-Off Analyses and Plan Selection

The economic and social benefits of the channel modification alternative plan are far more significant than the slight environmental quality advantage of No Action. In consideration of project uncertainties, Plan WCC-P4A5 appears to have a high probability of having economic benefits relative to No Action and was therefore chosen as the Tentatively Selected Plan for this watershed.

TABLE 58
WARD CREEK FINAL ALTERNATIVES SUMMARY OF COMPARATIVE ITEMS

	ITEM	WCC-PA5 (TENTATIVELY SELECTED PLAN)	NO ACTION
I.	PLAN DESCRIPTION	CONCRETE LINED NORTH BRANCH I-10 TO I-12; MINIMAL CLEARING AND SNAGGING MAIN CHANNEL AND DAWSON CREEK TO BAYOU DUPLANTIER	
II.	NATIONAL ECONOMIC DEVELOPMENT		
	A. PROJECT FIRST COST	$ 9,434,000	$0
	B. O&M COST	$ 51,000	$0
	C. TOTAL AVERAGE ANNUAL COSTS	$ 932,000	$0
	D. TOTAL AVERAGE ANNUAL BENEFITS	$ 1,032,000	$0
	E. NET ANNUAL BENEFITS	$ 100,000	$0
	F. BENEFIT-COST RATIO	1.11	N/A
III.	ENVIRONMENTAL QUALITY		
	A. AGRICULTURAL LANDS	28 ACRES DIRECTLY IMPACTED BY FOREST REPLANTING	SOME ADVERSE IMPACT DUE TO RECURRING FLOODING
	B. FORESTLANDS	22 ACRES AFFECTED BY PROJECT; 28 ACRES WOULD BE CREATED VIA MITIGATION	NO IMPACT
	C. THREATENED AND ENDANGERED SPECIES	NONE AFFECTED	NONE AFFECTED
	D. AQUATIC RESOURCES AND WATER QUALITY	SHORT-TERM ADVERSE IMPACT; REDUCED DIVERSITY; INCREASED TEMPERATURES	NO IMPACT

this area. Flood stage lowerings associated with Plan WCC-P4A5 reduces the size of the 100-year floodplain.

Plan WCC-P4A5 is the only action alternative included in the final array of alternatives. No other economically feasible action alternative was retained for comparison.

Regional Economic Development

Reducing flood damage frequency and cost will improve economic growth, employment, property valuation, and tax revenue in the region. Conversely, allowing flooding to continue to occur could likely result in decreasing same. Direct economic benefits to existing property is included in the NED estimates above. Induced economic benefits are speculative to a large degree and are not calculated directly into the benefit-cost analysis. These items are addressed in the Economic Appendix H and are listed in summary in Table 58.

Plan WCC-P4A5 will significantly reduce flooding frequency and cost and therefore is far preferable to No Action given economic development considerations.

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Social effects considered in evaluating each alternative plan are listed in Table 58. Health, safety, and the quality of community life will obviously be significantly improved by the channel modification plan.

Trade-Off Analyses and Plan Selection

The economic and social benefits of the channel modification alternative plan are far more significant than the slight environmental quality advantage of No Action. In consideration of project uncertainties, Plan WCC-P4A5 appears to have a high probability of having economic benefits relative to No Action and was therefore chosen as the Tentatively Selected Plan for this watershed.

TABLE 58
WARD CREEK FINAL ALTERNATIVES SUMMARY OF COMPARATIVE ITEMS

	ITEM	WCC-PA5 (TENTATIVELY SELECTED PLAN)	NO ACTION
I.	PLAN DESCRIPTION	CONCRETE LINED NORTH BRANCH I-10 TO I-12; MINIMAL CLEARING AND SNAGGING MAIN CHANNEL AND DAWSON CREEK TO BAYOU DUPLANTIER	
II.	NATIONAL ECONOMIC DEVELOPMENT		
	A. PROJECT FIRST COST	$ 9,434,000	$0
	B. O&M COST	$ 51,000	$0
	C. TOTAL AVERAGE ANNUAL COSTS	$ 932,000	$0
	D. TOTAL AVERAGE ANNUAL BENEFITS	$ 1,032,000	$0
	E. NET ANNUAL BENEFITS	$ 100,000	$0
	F. BENEFIT-COST RATIO	1.11	N/A
III.	ENVIRONMENTAL QUALITY		
	A. AGRICULTURAL LANDS	28 ACRES DIRECTLY IMPACTED BY FOREST REPLANTING	SOME ADVERSE IMPACT DUE TO RECURRING FLOODING
	B. FORESTLANDS	22 ACRES AFFECTED BY PROJECT; 28 ACRES WOULD BE CREATED VIA MITIGATION	NO IMPACT
	C. THREATENED AND ENDANGERED SPECIES	NONE AFFECTED	NONE AFFECTED
	D. AQUATIC RESOURCES AND WATER QUALITY	SHORT-TERM ADVERSE IMPACT; REDUCED DIVERSITY; INCREASED TEMPERATURES	NO IMPACT

TABLE 58 (CONTINUED)
WARD CREEK FINAL ALTERNATIVES SUMMARY OF COMPARATIVE ITEMS

	ITEM	WCC-PA5 (TSP)	NO ACTION
	E. SEDIMENTATION	PROJECT WILL REDUCE STREAMBANK EROSION AND WILL SLIGHTLY IMPROVE SEDIMENTATION	EROSION RATES ARE HIGH IN THE UPPER REACHES
	F. AIR QUALITY	MINOR SHORT-TERM IMPACTS DURING CONSTRUCTION	NO IMPACT
	G. NATIONAL REGISTER OF HISTORIC PLACES	NO IMPACT	NO IMPACT
	H. CULTURAL PROPERTIES	VERY SLIGHT CHANCE OF UNCOVERING UNKNOWN SITES DURING CONSTRUCTION	NO IMPACT
IV.	REGIONAL ECONOMIC DEVELOPMENT		
	A. REGIONAL INCOME AND EMPLOYMENT	IMPROVED VALUE WILL LIKELY FACILITATE URBAN GROWTH	INCOME AND BUSINESS MAY BE REDUCED DUE TO RECURRING FLOODING
	B. REGIONAL GROWTH AND BUSINESS ACTIVITY	INCREASED EMPLOYMENT FOR CONSTRUCTION; BETTER ECONOMIC CLIMATE DUE TO REDUCTION IN FLOOD THREAT	INCOME AND BUSINESS MAY BE REDUCED DUE TO RECURRING FLOODING
	C. TAX REVENUE	IMPROVED FLOOD PROTECTION WILL STABILIZE TAX BASE	INCOME AND BUSINESS MAY BE REDUCED DUE TO RECURRING FLOODING
	D. PROPERTY VALUE	IMPROVED FLOOD PROTECTION WILL LIKELY STABILIZE OR RAISE PROPERTY VALUES	PROPERTY VALUES MAY DECLINE DUE TO RECURRING FLOODING

TABLE 58 (CONTINUED)
WARD CREEK FINAL ALTERNATIVES SUMMARY OF COMPARATIVE ITEMS

	ITEM	WCC-PA5 (TSP)	NO ACTION
V.	OTHER SOCIAL EFFECTS		
	A. URBAN AND COMMUNITY IMPACTS	POSITIVE IMPACTS DUE TO IMPROVED FLOOD PROTECTION	ADVERSE IMPACTS DUE TO FLOOD THREAT
	B. LIFE, HEALTH, AND SAFETY	THREAT TO LIFE, HEALTH, AND SAFETY REDUCED	RECURRING FLOODS THREATEN LIFE, HEALTH, AND SAFETY
	C. DISPLACEMENT	NONE EXPECTED	NO IMPACT
	D. LONG-TERM PRODUCTIVITY	POSITIVE IMPACT DUE TO REDUCED FLOOD THREAT	ADVERSE IMPACTS DUE TO FLOOD THREAT
	E. LEISURE	NO IMPACT	NO IMPACT
	F. AESTHETIC	SOME ADVERSE IMPACT BY REMOVING TREES FROM CHANNELS; MITIGATED WITH REPLANTED TREE LINE	NO IMPACT
	G. COMMUNITY COHESION	PRESERVED DUE TO REDUCED FLOOD THREAT	ADVERSE IMPACTS DUE TO FLOOD THREAT
	H. COMMUNITY GROWTH	POSITIVE IMPACT DUE TO REDUCED FLOOD THREAT	ADVERSE IMPACTS DUE TO FLOOD THREAT
	I. TRANSPORTATION	MINOR DISRUPTION DURING CONSTRUCTION; IMPROVED SITUATION BY REDUCING FLOODING	SOME ADVERSE IMPACTS DURING FLOOD EVENTS
	J. NOISE	MINOR INCREASE IN NOISE DURING CONSTRUCTION	NO IMPACT
	K. QUALITY OF LIFE	REDUCED FLOODING WILL SUBSTANTIALLY IMPROVE THE	ADVERSE IMPACTS FOR THOSE AFFECTED BY FLOODING

SOURCE: U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT

BAYOU FOUNTAIN

The Bayou Fountain Watershed is located in the southern portion of East Baton Rouge Parish (see Plate 9). Bayou Fountain originates on the Louisiana State University Campus and generally flows in a southeasterly direction into Bayou Manchac. The major tributaries to Bayou Fountain are Elbow Bayou, Bayou Fountain North Branch, Bayou Fountain South Branch, and Selene Bayou. Bayou Fountain and tributaries drain about 40 square miles.

The principal residential developments in the Bayou Fountain drainage area lie on the bluff adjacent to Louisiana State Highway 42 (Highland Road) and also in areas adjacent to Louisiana State Highway 30 (Nicholson Drive) just south of Louisiana State University. In recent years, developments have migrated to floodplain areas. Land use maps for 1972, 1978, and 1985 are shown on Plates 28, 29, and 30 of Appendix J. The watershed is largely agricultural and forestlands comprise about 72 percent of the watershed. The watershed is about 26 percent urban. It is located near major traffic arteries and industrial sites along the river. The watershed serves as a place of residence for workers in Baton Rouge and along the river. Commercial growth is strong in the area. The watershed has a very great potential for future growth as it is located near the center of the city of Baton Rouge and to the university. It also borders the Mississippi River, which provides opportunities for industrial expansion.

There are approximately 2,400 residential and commercial structures within various floodplains in the watershed. The distribution of structures within the various floodplains is shown in Table 59. The approximate 10-year floodplain boundary is shown on Plate 9. Calculated existing equivalent annual flood damages for all subbasins in this watershed are listed in Table 60. Methodology used in calculating these values can be found in Economics Appendix H.

Both headwater and backwater flooding occur in this basin. Most flood damage results from headwater conditions. Heavy rainfall inside the watershed itself often causes headwater flooding immediately above Siegen Lane where stage

differentials of several feet occur upstream to Gardere Lane. Significant headwater flooding also occurs in the upper basin on the Louisiana State University campus. Stages also rise to structure damaging levels when the Amite River rises to flood stage levels. Water from the Amite River backs into Bayou Manchac, which in turn backs into Bayou Fountain. Backwater flooding occurs from Bayou Fountain's mouth upstream to just above Siegen Lane. In January 1993, some residents close to Siegen Lane experienced a "two-phase" flood. Immediately following the rain event, headwaters passed through Bayou Fountain causing flooding, then subsiding. About 12 to 24 hours later, the rise in the Amite River from the same rainfall event upstream caused a rise in Bayou Fountain, which again caused flooding of some of the same structures near Siegen Lane.

TABLE 59

BAYOU FOUNTAIN - DISTRIBUTION OF STRUCTURES WITHIN VARIOUS FLOODPLAINS

BASIN NO.	STRUCTURE CATEGORY	0-10 YEAR	10-25 YEAR	25-50 YEAR	50-100 YEAR	100-500 YEAR	ABOVE 500 YEAR	ALL FLOOD ZONES
BASIN NAME: BAYOU FOUNTAIN								
29	1-STORY	41	130	26	33	531	432	1,193
	2-STORY	7	50	113	5	196	133	504
	MOBILE HOME	0	0	0	0	0	6	6
	APT.BLDGS.	39	125	101	10	54	39	368
	COMMERCIAL	8	22	11	45	112	82	280
	TOTAL	95	327	251	93	893	692	2,351

SOURCE: U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT

TABLE 60

BAYOU FOUNTAIN
CALCULATED WITHOUT PROJECT EQUIVALENT ANNUAL FLOOD DAMAGES

BASIN	REACH	EQUIVALENT ANNUAL DAMAGES WITHOUT PROJECT*
29	A	$ 194,000
	B	$ 0
	C	$ 16,000
	D	$ 274,000
	D1	$ 117,000
	D2	$ 74,000
	E	$ 15,000
	G	$ 296,000
	H	$ 21,000
	I	$ 77,000
	I2	$ 221,000
	K	$ 2,000
	L	$ 63,000
	M	$ 285,000
	TOTAL	$1,655,000

* 2ND QUARTER 1994 PRICE LEVELS

SOURCE: U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT

POSSIBLE OPTIONS TO REDUCE FLOOD DAMAGES

Structural Measures

(See Plates 25-41)

Detention/Retention Storage

Due to the lack of topographical relief in this watershed, detention/retention storage basins were determined to be impractical. Required basin containment structures, primarily earthen levees, in conjunction with land requirements would be excessive in order to achieve significant flow retention.

Channel Modifications

Channel improvements to the main stem and both tributaries of Bayou Fountain were determined to be practical options and were investigated.

Various channel modification plans were developed for the Bayou Fountain watershed. The plan generally consists of about 11 miles of channel modification along Bayou Fountain. Because backwater from Bayou Manchac extends from the mouth of Bayou Fountain to just upstream of the Siegen Lane bridge, the plans were designed to provide various levels of protection in the headwater reaches. In general, the channel modifications were sized to contain headwater flows within banks for the design frequencies. However, for the 100-year design, high backwater stages make it impractical to design a channel enlargement to put the flood stages within banks. In addition, because the 10-year design required upstream channel enlargement, a minimum channel design (clearing and snagging only) was also developed for this stream. Soil conditions along the channels will likely allow channel widening without special erosion protection. In addition, plans were developed where the earthen channel designs were concrete lined and the levels of protection were determined.

Pumping Stations

(Pumping Station at the Mouth of Bayou Fountain)

This pumping station scheme consists of a containment levee at the mouth of Bayou Fountain, gravity outlets for normal daily discharges, and a pumping station for flood events. The containment levee prevents Bayou Manchac's backwater flows from filling the large sump area on Bayou Fountain below the Siegen Lane bridge. The sump area is used to store Bayou Fountain discharges and, therefore, minimizes the required pumping station capacities.

The containment levee is located approximately 1,500 feet upstream of the mouth and runs generally in a northeast to southwest direction where it meets the natural ridge paralleling Bayou Manchac. It follows the ridge maintaining a crest elevation of 18.0 feet NGVD until it meets higher ground. The crest elevation was set at the 100-year flood elevation plus 2 feet of freeboard.

Pumping station capacities of 300, 600, and 900 cfs were considered for this alternative. Each design consisted of three pumps. The average daily stage of the sump area is 2.3 feet NGVD based on 35 years of daily stage recordings at the Spanish Lake floodgate on Alligator Bayou. For each of these alternatives, it was assumed that the first pump would be turned on when sump pool stages exceeded 3.5 feet NGVD.

Gravity outlets, three concrete box culverts, were designed to pass interior flows up to the 25-year discharges, minus the pumping station capacity, with a minimum of 3 feet of head. They were located in the containment levee with an invert elevation of 0.0 feet NGVD.

Hydraulic analyses indicate that this pumping station scheme produces stage lowerings of 0-5 feet in the sump area, however, the impact on upstream reaches becomes minimal. At Ben Hur Road, only 0.1 - 0.2 feet of lowering can be achieved.

(Pumping Station on Elbow Bayou)

Elbow Bayou, a tributary of Bayou Fountain, has a total drainage are of approximately 15 square miles. As such, an alternative was considered that would remove the majority of Elbow Bayou flows from Bayou Fountain. Openings along Highway 30 for Elbow Bayou drainage to Bayou Fountain would be closed and existing channels would be enlarged to convey Elbow Bayou drainage towards the Mississippi River levee, where a pumping station would pass the flows over the levee into the river.

The pumping station would be located at the Mississippi River levee near River Mile 220. This location would allow Elbow Bayou flows to be stored in the low area near this station. The pumping station would consist of five 250 cfs pumps. The pump capacity was sized such that interior stages would not exceed existing conditions on Elbow Bayou. The first pump would be turned on when interior stages in the sump exceeded 16.0 feet NGVD. The pumps would be required to lift discharges over the Mississippi River levee which has a design grade, at this location, of 47.5 feet NGVD. In addition, approximately 3.5 miles of channel enlargement and development would be required to convey the flows to the sump area and to the pumping station.

The results of this alternative indicate that peak stages on Bayou Fountain are not significantly reduced (0.2 feet) by removing the Elbow Bayou basin west of Highway 30. This occurs because the Elbow Bayou hydrograph is attenuated and its peak is reduced when routed through the natural sump area between Highway 30 and Burbank Drive. Because of the small impact on Bayou Fountain's flood stages, this alternative was eliminated from further consideration.

(Pumping Station Located on Upper Bayou Fountain)

Flood damages currently occur in a concentrated area on the Louisiana State University campus at the very upstream portion of the basin. An alternative plan to reduce these damages was developed. This plan consists of placing a pumping station on the South Branch Tributary and pumping either to the Mississippi River, or, in-line to South Branch Tributary. In both cases, upstream stages would be reduced. In diverting

flow to the river, additional flood damage reduction occurs downstream.

Three pumping station capacities of 700, 525, and 350 cfs were analyzed. It was determined that existing upstream channel capacity limits the effectiveness of the proposed pumping stations. Upstream channel widening was therefore included in the pumping station plan. With or without the upstream channel modification, it was determined that the 350 cfs station has virtually the same effectiveness as the larger capacities. Designs and costs were therefore only developed for the 350 cfs station.

Diverting flood flow to the Mississippi River, or, blocking the main channel and pumping in-line back to the channel were considered. In diverting flow to the river, some downstream benefits are realized. Pumping in-line to the bayou can be accomplished without increasing downstream stages. The advantage of such a plan is a net lower cost associated with constructing a floodwall and levee across the bayou in lieu of effluent pipelines and outfall to the river. While some special operational procedures would be required under some flood scenarios, in-line pumping can be done without raising downstream stages. This is due to the fact that existing flow rates can be maintained while water levels immediately upstream of the station are lowered by the pumps. This plan would likely have, however, a public acceptance problem. Downstream residents would likely perceive that this station would increase flooding in their area and therefore not support the plan.

A significant uncertainty exists with these plans regarding seepage flows from the Mississippi River. Medium to high river levels currently cause moderate to severe seepage flows in the South Branch Tributary. This flow rate is not known, but may influence the effectiveness of the proposed pumping station. Channel maintenance is also a concern given artificial drawdowns induced by the proposed pumping station under high river conditions.

Floodgate

An alternative plan using a floodgate structure in the containment levee in place of a pumping station was considered. Like the pumping station alternatives, this alternative would prevent flows due to backwater from Bayou Manchac from entering the Bayou Fountain sump area. Historically, stages in Bayou Fountain will usually peak before the Bayou Manchac backwater, thereby allowing flood flows from Bayou Fountain to pass through the proposed floodgates. As stages rose on Bayou Manchac, the floodgates would close and Bayou Fountain flows would be stored in the sump area. The floodgate structure was sized to pass the 25-year flow with a head of 3 feet. Interior stages above the sump area would not exceed existing conditions stages. The floodgate would consist of two 8′ x 8′ concrete box culverts with flapgates placed in the containment levee with an invert elevation of 0.0 feet NGVD.

This plan, like the pumping station plan, provides additional storage capacity by preventing backwater from filling the sump area. However, upstream of the sump area, flood stages were only reduced by 0 to 0.5 feet.

Combination of Structural Plans

Additional alternatives were studied in which the pump station and floodgate plans located at the bayou's mouth were combined with selected earthen, concrete-lined, and minimum channel improvements. The addition of the pumping station or the floodgate provided additional stage lowerings over those provided by the channel improvements alone of about 1.0 to 5.0 feet in the sump area near the mouth of Bayou Fountain and of about 0.5 feet to 1.5 feet near the upper limit of the backwater effects near Siegen Lane. However, in the headwater reaches above Siegen Lane, where most flood damages occur, the additional stage lowerings are generally less than 0.2 feet. As a result, the addition of pump stations or floodgates to the channel modification plans provides minimal additional flood control benefits.

The pumping station alternative proposed for Upper Bayou Fountain was determined to produce some downstream benefits only if flow from the upper basin is diverted to the

Mississippi River. These benefits were determined to only occur independent of downstream channel modifications. With proposed downstream channel modifications in place, low frequency flood events remain within streambank and the beneficial effects of the diverted flow from the proposed upstream pumping station become negligible. The combination of the proposed Upper Bayou Fountain pumping station plan with other structural measures was, therefore, not considered further.

Nonstructural Measures

Nonstructural flood damage reduction measures are those which reduce or avoid flood damages without significantly altering either the nature or extent of flooding. Such measures reduce flood losses by either changing the use of the floodplain or by retaining existing floodplain use with modifications made to the structures or facilities susceptible to flood damages. Nonstructural measures for existing developed areas could include permanent evacuation and relocation of properties from the floodplain or flood proofing of structures by means of levees, floodwalls, barriers, or by elevating structures above flood levels. Such measures for future development could include floodplain zoning, fill of flood plain areas, or regulations to control future runoff from rainfall.

Practical nonstructural solutions for Bayou Fountain are limited primarily to floodplain buy out of properties susceptible to flooding in the 0 - 25-year floodplain. Almost all residential, commercial, and industrial structures in the study area are constructed on concrete slab foundations. It is technically possible, but impractical and not economical to elevate a large number structures above flood prone areas.

The number and types of structures in the 0 - 25-year floodplain are shown below:

	Floodplain	
	0-10	10-25
Residential	87	305
Commercial	8	22
Total	85	327

Ring levee plans were considered for two subdivisions along Bayou Fountain, Highland Park and Meadow Bend. On June 27-28, 1989, Tropical Storm Allison provided about 10 inches of rain in a 24-hour period on the Bayou Fountain watershed causing the two subdivisions to experience severe flooding. The ring levee crests were set at the 100-year flood elevation plus 2 feet of freeboard (19.8 feet NGVD for both subdivisions). The levee section has 1V on 4H side slopes with a 10-foot wide crown. The pumping stations and gravity outlets were designed to evacuate the 10-year, 24-hour rainfall within 48 hours. The pumping stations were sized to prevent interior stages from exceeding the damage elevation of 17.0 feet NGVD for the conditions stages for the range of frequencies studied. The gravity outlet culverts were sized to pass the 10-year flow with 1 foot of head.

Land use projections indicate that the watershed will be 65 percent urbanized by the year 2040. This significant increase in urbanization with the resulting increase in flood stages will substantially reduce the effectiveness of any proposed structural plan. In order not to reduce the level of flood protection provided by a structural plan, floodplain management is necessary. East Baton Rouge Parish will be required to implement a stormwater retention ordinance stating that additional runoff caused by changed soil or surface conditions after the new development must be retained on site so that runoff leaving the development site is maintained at or below predevelopment rates. Similar ordinances have been implemented in Shreveport and New Iberia, Louisiana.

In addition to the above, the Federal Emergency Management Agency is in the process of establishing a "floodway" along Bayou Fountain. Once implemented, this floodway zone will curtail development adjacent to the bayou.

It was determined that the environmental impacts of channel modification alternative plans would generally be limited to the destruction of some bottomland hardwood forestation that occurs along the channel banks. These impacts can be readily mitigated by equivalent reforestation of existing cleared lands or by protecting equivalent areas of existing forested lands.

Existing disposal areas were investigated to avoid the adverse environmental impact. The East Baton Rouge Parish of Public Works identified the parish landfill as the place to haul excavated material. Therefore, the initial cost estimates were developed assuming that excavated material would be hauled to this location. See Plate 51.

Initial alternatives for this watershed are listed in Table 61 and are detailed in Table 62.

TABLE 61

BAYOU FOUNTAIN - INITIAL ALTERNATIVE PLANS SUMMARY

ALTERNATIVE	DESCRIPTION
BF10	10-Year Earthen Channel
BF25	25-Year Earthen Channel
BF50	50-Year Earthen Channel
BF25C	25-Year Concrete-Lined Channel
BF50C	50-Year Concrete-Lined Channel
BFPS300	300 cfs Pumping Station Located at Bayou's Mouth
BFPS600	600 cfs Pumping Station Located at Bayou's Mouth
BFPS900	900 cfs Pumping Station Located at Bayou's Mouth
BFGATE	Backwater Flapgate Located at Bayou's Mouth
UBF350A	350 cfs Pumping Station Located on Upper Bayou Fountain with Diversion to the Mississippi River
UBF350B	350 cfs Pumping Station Located on Upper Bayou Fountain with In-Line Discharge
MEADRL	Ring Levee around Meadowland Subdivision
HLPKRL	Ring Levee around Highland Park Subdivision
BUYOUT10	Buyout of Properties Located in the 10-Year Floodplain
BUYOUT25	Buyout of Properties Located in the 25-Year Floodplain

TABLE 61 (Continued)

BAYOU FOUNTAIN - INITIAL ALTERNATIVE PLANS SUMMARY

ALTERNATIVE	DESCRIPTION
(COMBINATION PLANS)	
BF10-BFGATE	10-Year Earthen Channel with Backwater Flapgate Located at Bayou's Mouth
BFPS300-C/S	300 cfs Pumping Station Located at Bayou's Mouth with Upstream Channel Clearing and Snagging
BFPS300-BF10	300 cfs Pumping Station Located at Bayou's Mouth with 10-Year Earthen Channel
BFPS600-BF10	600 cfs Pumping Station Located at Bayou's Mouth with 10-Year Earthen Channel
BFPS600-BF25C	600 cfs Pumping Station Located at Bayou's Mouth with 25-Year Concrete-Lined Channel
BFPS900-BF25C	900 cfs Pumping Station Located at Bayou's Mouth with 25-year Concrete-Lined Channel

Source: U.S. Army Corps of Engineers, New Orleans District

TABLE 62
BAYOU FOUNTAIN - INITIAL ALTERNATIVE PLANS

PLAN	REACH	TYPE OF IMPROVEMENT
BF10 - 10-Year Earthen Channel		
	Mouth to Siegen Lane	Clearing and snagging
	Siegen to Gardere Lane	50' BW, 1V on 3H SS
	Gardere Lane to E. Boyd Road	Clearing and snagging
BF25 - 25-Year Earthen Channel		
	Mouth to Siegen Lane	Clearing and snagging
	Siegen to Gardere Lane	50' BW, 1V on 3H SS
	Gardere Lane to E. Boyd Road	20' BW, 1V on 3H SS
BF50 - 50-Year Earthen Channel		
	Mouth to Siegen Lane	Clearing and snagging
	Siegen to Gardere Lane	50' BW, 1V on 3H SS
	Gardere Lane to E. Boyd Road	40' BW, 1V on 3H SS
BF25C - 25-Year Concrete-Lined Channel		
	Mouth to Siegen Lane	Clearing and snagging
	Siegen to Gardere Lane	Concrete line existing channel
	Gardere Lane to E. Boyd Road	Concrete line existing channel
BF50C - 50-Year Concrete-Lined Channel		
	Mouth to Siegen Lane	Clearing and snagging
	Siegen to Gardere Lane	50' BW, 1V on 3H SS concrete-lined channel
	Gardere Lane to E. Boyd Road	Concrete line existing channel

TABLE 62 (CONTINUED)
BAYOU FOUNTAIN - INITIAL ALTERNATIVE PLANS

PLAN	REACH	TYPE OF IMPROVEMENT
BFPS300 - 300 cfs Pumping Station Located at Bayou's Mouth		
	Mouth to Siegen Lane	300 cfs pumping station and barrier levee
	Siegen to Gardere lane	No work
	Gardere Lane to E. Boyd Road	No work
BFPS600 - 600 cfs Pumping Station Located at Bayou's Mouth		
	Mouth to Siegen Lane	600 cfs pumping station and barrier levee
	Siegen to Gardere Lane	No work
	Gardere Lane to E. Boyd Road	No work
BFPS900 - 900 cfs Pumping Station Located at Bayou's Mouth		
	Mouth to Siegen Lane	900 cfs pumping station and barrier levee
	Siegen to Gardere Lane	No work
	Gardere Lane to E. Boyd Road	No work
BFGATE - Backwater Flapgate Located at Bayou's Mouth		
	Mouth to Siegen Lane	Flapgate and barrier levee
	Siegen to Gardere Lane	No work
	Gardere Lane to E. Boyd Road	No work

TABLE 62 (CONTINUED)

BAYOU FOUNTAIN - INITIAL ALTERNATIVE PLANS

PLAN	REACH	TYPE OF IMPROVEMENT
UBF350A - 350 cfs Pumping Station on Upper Bayou Fountain with Discharge to the Mississippi River		
	Bayou Fountain/South Branch Confluence	New 0.8 mile diversion channel; 1V on 3H SS; earthen channel; 350 cfs pumping station with 2 66-inch discharge lines to the Mississippi River
	South Branch (all)	Widen to 20' BW, 1V on 3H SS earthen channel
		Replace 3 bridges
UBF350B - 350 cfs Pumping Station on Upper Bayou Fountain with Discharge into Bayou Fountain		
	Bayou Fountain/ South Branch Confluence	350 cfs pumping station and barrier wall/levee
	South Branch (all)	Widen to 20' BW, 1V on 3H SS earthen channel
		Replace 3 bridges
MEADRL - Ring Levee around Meadow Bend Subdivision		
	N/A	Construct ring levee around elevation 19.8' NGVD
		Install 120 cfs pumping station and 3 42-inch gravity culverts
HLPKRL - Ring Levee around Highland Park Subdivision		
	N/A	Construct ring levee around elevation 19.8' NGVD
		Install 30 cfs pumping station and 3 42-inch gravity culverts

TABLE 62 (CONTINUED)

BAYOU FOUNTAIN - INITIAL ALTERNATIVE PLANS

PLAN	REACH	TYPE OF IMPROVEMENT
BUYOUT10 - Buyout of Properties Located in 10-Year Floodplain		
	N/A	Purchase 41 residential and 46 commercial properties
BUYOUT25 - Buyout of Properties Located in 25-Year Floodplain		
	N/A	Purchase 202 residential and 47 commercial properties
BF10-BFGATE - 10-Year Earthen Channel with Backwater Flapgate Located at Bayou's Mouth		
	Mouth to Siegen Lane	Flapgate and barrier levee; channel clearing and snagging
	Siegen to Gardere Lane	50' BW, 1V on 3H SS
	Gardere Lane to E. Boyd Road	Clearing and snagging
BFPS300-C/S - 300 cfs Pumping Station Located at Bayou's Mouth with Channel Clearing and Snagging		
	Mouth to Siegen Lane	300 cfs pumping station and barrier levee; channel clearing and snagging
	Siegen to Gardere Lane	Clearing and snagging
	Gardere Lane to E. Boyd Road	Clearing and snagging
BFPS300-BF10 - 300 cfs Pumping Station Located at Bayou's Mouth with 10-Year Earthen Channel		
	Mouth to Siegen Lane	350 cfs pumping station and barrier levee; channel clearing and snagging

TABLE 62 (CONTINUED)
BAYOU FOUNTAIN - INITIAL ALTERNATIVE PLANS

PLAN	REACH	TYPE OF IMPROVEMENT
BFPS300-BF10 - 300 cfs Pumping Station Located at Bayou's Mouth with 10-Year Earthen Channel (Continued)		
	Siegen to Gardere Lane	50' BW, 1V on 3H SS
	Gardere Lane to E. Boyd Road	Clearing and snagging
BFPS600-BF10 - 600 cfs Pumping Station Located at Bayou's Mouth with 10-Year Earthen Channel		
	Mouth to Siegen Lane	600 cfs pumping station and barrier levee; channel clearing and snagging
	Siegen to Gardere Lane	50' BW, 1V on 3H SS
	Gardere Lane to E. Boyd Road	Clearing and snagging
BFPS600-BF25C - 600 cfs Pumping Station Located at Bayou's Mouth with 25-Year Concrete-Lined Channel		
	Mouth to Siegen Lane	600 cfs pumping station and barrier levee; channel clearing and snagging
	Siegen to Gardere Lane	Concrete line existing channel
	Gardere Lane to E. Boyd Road	Concrete line existing channel
BFPS900-BF25C - 900 cfs Pumping Station Located at Bayou's Mouth with 25-Year Concrete-Lined Channel		
	Mouth to Siegen Lane	900 cfs pumping station and barrier levee; channel clearing and snagging
	Siegen to Gardere Lane	Concrete line existing channel
	Gardere Lane to E. Boyd Road	Concrete line existing channel

Source: U.S. Army Corps of Engineers, New Orleans District

Screening of Initial Alternatives

In this iteration, only major cost items - construction, relocations, real estate, and annual operations and maintenance were considered. Benefits included in this part of the analyses were calculated as "direct" property inundation flood damage reductions plus an estimated percentage (20%) of "indirect" flood damage reduction benefits. "Indirect" items include such things as public agency emergency costs, flood insurance reductions, and lower construction costs within the floodplain.

Cost-benefit calculations for each initial alternative are shown in Table 63. A period of 50 years and an annual interest rate of 8.00% were used to calculate equivalent annual values. Costs and benefits shown are all relative to the base condition or "No Action" Plan.

The initial benefit-cost calculations revealed that only four plans have a benefit-to-cost ratio greater than, or close to greater than 1.0. They are: BF10, BF25, and BF50 - the 10, 25, and 50-year earthen channels, and, BFGATE-C/S flapgate barrier levee at the bayou's mouth along with channel clearing and snagging. All pumping station plans, upstream and at the bayou's mouth, and in combination with channel modifications were not determined to be cost-effective and were eliminated from further consideration at this point. Also, the non-structural plans of property buy-outs and subdivision ring levees were not determined to be cost-effective and were also eliminated from further consideration.

At this point further "qualitative" screening was performed for each plan relative to each other. The channel modification plans have a relatively high degree of both performance and project cost certainty. These plan will significantly improve headwater flooding in the area where this problem frequently occurs. The backwater flapgate will have very little impact on headwater flooding, only providing some headwater benefit when a secondary rainfall occurs after the Amite River has risen. While backwater flooding is significant, it is not as frequent as the headwater events. Also, some relatively higher degree of cost uncertainty with

the proposed structure is a factor. With the Comite River Diversion Canal plan in place, backwater lowerings of up to 0.5 feet will occur in the Bayou Fountain backwater area. This in turn reduces the calculated flood control benefits of the flapgate plan. Also, given relatively equal economics, East Baton Rouge's engineering staff expressed a strong preference for the channel improvement plan relative to the backwater flapgate. In consideration of the above, the backwater flapgate plan was eliminated from further evaluation.

It was also determined from stage-frequency calculations that proposed channel modifications of the upstream reaches of Bayou Fountain to East Boyd Road are only minimally effective. Thus, the remaining channel modification plans were scaled back and reformulated eliminating upstream modifications from Ben Hur Road up to East Boyd Road. Four intermediate plans were developed and evaluated. Two plans consist of a 10-year earthen channel modification with upstream limits at either mile 54.3 or Ben Hur Road (BF10A and BF10B). The other two plans consist of a 25-year earthen channel modification with two upstream limits identical to the 10-year plans (BF25A and BF25B). These plans were refined further by including a modification of a 60-inch sewerline crossing just upstream of Gardere Lane. Table 64 lists details of the four intermediate plans and they are also shown on Plates 40 and 41.

TABLE 63

BAYOU FOUNTAIN - INITIAL ALTERNATIVE PLANS

CALCULATED BENEFITS AND COSTS
($1,000)

PLAN	FIRST COST	EQUIVALENT ANNUAL COST (INCLUDING O&M)	INUNDATION REDUCTION BENEFITS	NET BENEFITS	B/C RATIO
BF-10	$ 2,457	$ 284	$ 298	$14	1.05
BF25	$ 5,358	$ 527	$ 541	$14	1.03
BF50	$ 6,632	$ 645	$ 634	($11)	0.98
BF25C	$26,448	$2,440	$ 693	($1,747)	0.28
BF50C	$31,456	$2,989	$ 700	($2,289)	0.23
BFPS 300	$ 9,684	$ 920	$ 214	($706)	0.23
BFPS 600	$17,431	$1,657	$ 214	($1,443)	0.13
BFPS 900	$29,052	$2,751	$ 214	($2,537)	0.08
BF GATE	$ 3,766	$ 381	$ 210	($171)	0.55
UBF 350A	$10,700	$1,034	$ 799	($235)	0.77
UBF 350B	$10,100	$ 978	$ 487	($491)	0.50
MEAD RL	$ 875	$ 118	$ 31	($87)	0.26
HLPK RL	$ 496	$ 67	$ 48	($19)	0.72
BUYOUT 10	$11,900	$1,094	$ 967	($127)	0.88
BUYOUT 25	$12,325	$1,133	$1,030	($103)	0.91
BF 10-BF GATE	$ 7,100	$ 750	$ 508	($242)	0.68
BFPS 300-C/S	$10,255	$1,006	$ 439	($567)	0.44
BFPS 300-BF10	$12,141	$1,204	$ 576	($628)	0.48
BFPS 600-BF10	$19,888	$1,941	$ 625	($1,316)	0.32
BFPS 600-BF25C	$26,577	$2,506	$ 849	($1,657)	0.34
BFPS 900-BF25C	$31,456	$2,989	$ 847	($2,142)	0.28
BFGATE-C/S	$ 4,297	$ 430	$ 439	($9)	1.02

SOURCE: U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT

TABLE 64

BAYOU FOUNTAIN - INTERMEDIATE ALTERNATIVE PLANS

PLAN	REACH	TYPE OF IMPROVEMENT
BF10A - 10-Year Earthen Channel		
	Mouth to Siegen Lane	Clear and snag
	Siegen Lane to Gardere Lane	50' BW, 1V on 3H SS earthen channel
	Gardere Lane to 4400' upstream (Mile 54.3)	Clear and snag
	At Exist. Sewer Line Crossing Upstream of of Gardere Lane	Conc. U-Channel, 50' BW, Inv. Elev. 4.0
BF10B - 10-Year Earthen Channel		
	Mouth to Siegen Lane	Clear and snag
	Siegen Lane to Gardere Lane	50' BW, 1V on 3H SS earthen channel
	Gardere Lane to 4400' upstream (Mile 54.3)	Clear and snag
	At Exist. Sewer Line Crossing Upstream of of Gardere Lane	Conc. U-Channel, 50' BW; Inv. Elev. 4.0
	Mile 54.3 to Ben Hur Road Bridge	Clear and snag
BF25A - 25-Year Channel		
	Mouth to Siegen Lane	Clear and snag
	Siegen Lane to Gardere Lane	50' BW, 1V on 3H SS earthen channel
	Gardere Lane to 4400' upstream (Mile 54.3)	5' BW, 1V on 3H SS concrete lined
	At Exist. Sewer Line crossing upstream of of Gardere Lane	Conc. U-Channel, 60' BW; Inv. Elev. 3.0

TABLE 64 (CONTINUED)

BAYOU FOUNTAIN - INTERMEDIATE ALTERNATIVE PLANS

PLAN	REACH	TYPE OF IMPROVEMENT
BF25B - 25-Year Channel		
	Mouth to Siegen Lane	Clear and snag
	Siegen Lane to Gardere Lane	50' BW, 1V on 3H SS earthen channel
	Gardere Lane to 4400' upstream (Mile 54.3)	5' BW, 1V on 3H SS concrete lined
	At Exist. Sewer Line crossing upstream of Gardere Lane	Conc. U-Channel, 60' BW, Inv. Elev. 3.0
	Mile 54.3 to Ben Hur Road Bridge	20' BW, 1V on 3H SS earthen channel

Source: U.S. Army Corps of Engineers, New Orleans District

Evaluation of Intermediate Alternative Plans

Calculated benefits and costs for the four intermediate plans are shown in Table 65. Only the 10-year earthen channel modification plans have benefits greater than estimated project costs. Both 25-year earthen channel modification plans were eliminated from consideration. Plan BF10B, 10-year channel modification to Ben Hur Road, was determined to have slightly higher net economic benefits relative to Plan BF10A which has project limits downstream at mile 54.3.

Analysis of Final Alternatives

Three plans were selected for final evaluation: BF10A, 10-year earthen channel modifications to mile 54.3; BF10B, 10-year earthen channel modifications to Ben Hur Road; and No Action. Since no alteration was made with the exception of above, details shown in the Initial Alternatives are the same. Final alternatives were evaluated relative to National Economic Development, Environmental Quality, Regional Economic

Development, and Social Effects. A summary of this evaluation is shown in Table 66.

TABLE 65

BAYOU FOUNTAIN
ECONOMIC ANALYSIS OF PLANS BF10A, BF10B, BF25A, AND BF25B

PLAN	FIRST COST	ANNUAL COST	ANNUAL INUNDATION REDUCTION BENEFITS	ANNUAL NET BENEFITS	B/C RATIO
BF10A	$3,836,000	$356,000	$416,000	$60,000	1.17
BF10B	$3,912,000	$362,000	$434,000	$72,000	1.20
BF25A	$7,371,000	$708,000	$479,000	($229,000)	0.68
BF25B	$8,796,000	$839,000	$492,000	($347,000)	0.59

SOURCE: U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT

National Economic Development (NED)

In the final analyses, environmental mitigation costs were included in each alternative plan's cost. It should be noted that the mitigation plan combines all mitigation requirements from all watersheds. Consolidating mitigation sites was determined to be far more practical than establishing individual mitigation sites for each watershed in the study area. Costs were prorated to each watershed based on alternative plan habitat losses. A complete description of the mitigation plan can be found in Appendix E, Section 1.

Alternative plan benefits and costs are listed in Table 60. As in the initial screening, a period of 50 years and 8.00% annual interest were used. Alternative Plan BF10B, channel modifications to Ben Hur Road, has the highest estimated net annual benefits of $61,000. This is just slightly higher than the $51,000 per year net benefits estimated for Plan BF10A. Both plans have marginal net economic benefits relative to No Action. Relative to each other, the estimated difference is small, but it is clearly apparent that there exists net economic benefits in extending the upstream proposed channel clearing and snagging limits from Mile 54.3 up to Ben Hur Road.

Environmental Quality

Impacts on the following environmental factors were evaluated for each final alternative plan:

- Agricultural Lands
- Forestlands
- Threatened and Endangered Species
- Aquatic Resources and Water Quality
- Sedimentation
- Air Quality
- Historic Places
- Cultural Properties

Detailed analyses of these factors can be found in the Environmental Impact Statement and Appendix E. Impacts are listed in summary in Table 66.

The only long-lasting environmental impacts produced by the final alternative plans affect agricultural lands and forestlands. Both Alternative Plans BF10A and BF10B directly impact some forestlands. This in turn indirectly impacts agricultural lands as they are proposed to be converted to forestlands as mitigation for same. The loss of these agricultural land acres is not considered to be significant for this area. Flood stage lowerings associated with Plans BF10A and BF10B reduce the size of the 100-year floodplain. Again, this "loss" is not considered to be significant since no wetlands are impacted.

Plan BF-10A results in slightly less conversion of woodlands and the subsequent less significant resultant conversion of agricultural lands via the mitigation plan, than does Plan BF-10B. Therefore, from an environmental standpoint, Plan BF-10A is the preferable action alternative.

Regional Economic Development

Reducing flood damage frequency and cost will improve economic growth, employment, property valuation, and tax revenue in the region. Conversely, allowing flooding to continue to occur could likely result in decreasing same. Direct economic benefits to existing property is included in the NED estimates above. Induced economic benefits are speculative to a large degree and are not calculated directly into the benefit-cost analysis. These items are addressed in the Economic Appendix H and are listed in summary in Table 60.

Both Plans BF10A and BF10B will significantly reduce flooding frequency and cost and therefore are far preferable to No Action given economic development considerations. Relative to each other, Alternative BF10B will reduce flood damages in a slightly larger area than BF10A. This in turn will induce a slightly higher level of future economic development in the watershed, the extent of which is difficult to quantify.

Social Effects

Social effects considered in evaluating each alternative plan are listed in Table 60. Health, safety, and the quality of community life will be significantly improved by both channel modification plans. Relative to other areas in the parish, there is a very high frequency of flooding in this watershed. Numerous flooding occurrences, along with the constant threat of same, is a major social problem. Both channel modification plans will significantly reduce flooding frequency in this watershed and, therefore, are far preferable to No Action. It is required that 122 acres of private property be permanently taken for the channel widening proposed in Plans BF10A and BF10B. This land is limited to the adjacent streambank and no structures would be affected. Relative to each other, Plan BF10B will reduce flood damages in a slightly larger area and is preferable to Plan BF10A in this category.

Trade-Off Analyses and Plan Selection

While there exists no direct net economic benefits with both channel modification plans relative to No Action, their advantages relative to improving the social effects of flooding

in the area make both plans far preferable to No Action. Construction of either plan will also have minimal adverse environmental impacts relative to No Action. These relative advantages to No Action are well within the range of uncertainty regarding costs and plan effectiveness of either channel modification plan.

Relative to each other, Alternative BF10B, channel modifications to Ben Hur Road, has slight advantages in regional economic development and social effects categories versus Plan BF10A, channel modifications to Mile 54.3. There is only a very slight environmental impact advantage for Plan BF10A relative to BF10B.

In consideration of all factors above, Alternative BF10B, 10-year earthen channel modifications to Ben Hur Road, was chosen as the Tentatively Selected Plan.

TABLE 66
BAYOU FOUNTAIN FINAL ALTERNATIVES SUMMARY OF COMPARATIVE ITEMS

	ITEM	BF10A	BF10B (TENTATIVELY SELECTED PLAN)	NO ACTION
I.	PLAN DESCRIPTION	CHANNEL MODIFICATION AND CLEARING AND SNAGGING TO MILE 54.3	CHANNEL MODIFICATION AND CLEARING AND SNAGGING TO BEN HUR ROAD	
II.	NATIONAL ECONOMIC DEVELOPMENT			
	A. PROJECT FIRST COST	$ 3,937,000	$ 4,031,000	$0
	B. O&M COST	$ 31,000	$ 31,000	$0
	C. TOTAL AVERAGE ANNUAL COSTS	$ 365,000	$ 373,000	$0
	D. TOTAL AVERAGE ANNUAL BENEFITS	$ 416,000	$ 434,000	$0
	E. NET ANNUAL BENEFITS	$ 51,000	$ 61,000	$0
	F. BENEFIT-COST RATIO	1.14	1.16	N/A
III.	ENVIRONMENTAL QUALITY			
	A. AGRICULTURAL LANDS	19 ACRES INDIRECTLY IMPACTED BY FOREST REPLANTING	22 ACRES INDIRECTLY IMPACTED BY FOREST REPLANTING	SOME ADVERSE IMPACT DUE TO RECURRING FLOODING
	B. FORESTLANDS	15 ACRES AFFECTED BY PROJECT; 22 ACRES WOULD BE CREATED VIA MITIGATION	17 ACRES AFFECTED BY PROJECT; 22 ACRES WOULD BE CREATED VIA MITIGATION	SOME REDUCTION
	C. THREATENED AND ENDANGERED SPECIES	NONE AFFECTED; COORDINATION REQUIRED	NONE AFFECTED; (SAME AS BF10A)	NONE AFFECTED
	D. AQUATIC RESOURCES AND WATER QUALITY	LOSS OF DIVERSITY; REDUCED SHADING	(SAME AS BF10A)	NO IMPACT

TABLE 66 (CONTINUED)
BAYOU FOUNTAIN FINAL ALTERNATIVES SUMMARY OF COMPARATIVE ITEMS

	ITEM	BF10A	BF10B (TSP)	NO ACTION
	E. SEDIMENTATION	PROJECT WILL REDUCE STREAMBANK EROSION AND WILL SLIGHTLY IMPROVE SEDIMENTATION	(SAME AS BF10A)	NO IMPACT
	F. AIR QUALITY	MINOR SHORT-TERM IMPACTS DURING CONSTRUCTION	(SAME AS BF10A)	NO IMPACT
	G. NATIONAL REGISTER OF HISTORIC PLACES	NO IMPACT	NO IMPACT	NO IMPACT
	H. CULTURAL PROPERTIES	FOUR POTENTIALLY SIGNIFICANT SITES ARE LIKELY TO OCCUR IN PROJECT AREA. MODERATE CHANCE OF UNCOVERING OTHER SITES. CHANNEL DESIGN CAN AVOID SITES IF NECESSARY.	(SAME AS BF10A)	NO IMPACT
IV.	<u>REGIONAL ECONOMIC DEVELOPMENT</u>			
	A. REGIONAL INCOME AND EMPLOYMENT	IMPROVED VALUE WILL LIKELY FACILITATE URBAN GROWTH	(SAME AS BF10A; SLIGHTLY BETTER)	INCOME AND BUSINESS MAY BE REDUCED DUE TO RECURRING FLOODING
	B. REGIONAL GROWTH AND BUSINESS ACTIVITY	INCREASED EMPLOYMENT FOR CONSTRUCTION; BETTER ECONOMIC CLIMATE DUE TO REDUCTION IN FLOOD THREAT	(SAME AS BF10A; SLIGHTLY BETTER)	INCOME AND BUSINESS MAY BE REDUCED DUE TO RECURRING FLOODING
	C. TAX REVENUE	IMPROVED FLOOD PROTECTION WILL STABILIZE TAX BASE	(SAME AS BF10A; SLIGHTLY BETTER)	INCOME AND BUSINESS MAY BE REDUCED DUE TO RECURRING FLOODING
	D. PROPERTY VALUE	IMPROVED FLOOD PROTECTION WILL LIKELY STABILIZE OR RAISE PROPERTY VALUES	(SAME AS BF10A; SLIGHTLY BETTER)	PROPERTY VALUES MAY DECLINE DUE TO RECURRING FLOODING

TABLE 66 (CONTINUED)
BAYOU FOUNTAIN FINAL ALTERNATIVES SUMMARY OF COMPARATIVE ITEMS

	ITEM	BF10A	BF10B (TSP)	NO ACTION
V.	OTHER SOCIAL EFFECTS			
	A. URBAN AND COMMUNITY IMPACTS	POSITIVE IMPACTS DUE TO IMPROVED FLOOD PROTECTION	(SAME AS BF10A; SLIGHTLY BETTER)	ADVERSE IMPACTS DUE TO FLOOD THREAT
	B. LIFE, HEALTH, AND SAFETY	THREAT TO LIFE, HEALTH, AND SAFETY REDUCED	(SAME AS BF10A; SLIGHTLY BETTER)	RECURRING FLOODS THREATEN LIFE, HEALTH, AND SAFETY
	C. DISPLACEMENT	SOME TAKING OF UNIMPROVED PRIVATE PROPERTY	(SAME AS BF10A; SLIGHTLY WORSE)	NO IMPACT
	D. LONG-TERM PRODUCTIVITY	POSITIVE IMPACT DUE TO REDUCED FLOOD THREAT	(SAME AS BF10A; SLIGHTLY BETTER)	ADVERSE IMPACTS DUE TO FLOOD THREAT
	E. LEISURE	NO IMPACT	NO IMPACT	NO IMPACT
	F. AESTHETIC	SOME ADVERSE IMPACT BY REMOVING TREES FROM CHANNELS; MITIGATED WITH REPLANTED TREE LINE	(SAME AS BF10A)	NO IMPACT
	G. COMMUNITY COHESION	PRESERVED DUE TO REDUCED FLOOD THREAT	(SAME AS BF10A; SLIGHTLY BETTER)	ADVERSE IMPACTS DUE TO FLOOD THREAT
	H. COMMUNITY GROWTH	POSITIVE IMPACT DUE TO REDUCED FLOOD THREAT	(SAME AS BF10A; SLIGHTLY BETTER)	ADVERSE IMPACTS DUE TO FLOOD THREAT
	I. TRANSPORTATION	MINOR DISRUPTION DURING CONSTRUCTION; IMPROVED SITUATION BY REDUCING FLOODING	(SAME AS BF10A)	SOME ADVERSE IMPACTS DURING FLOOD EVENTS
	J. NOISE	MINOR INCREASE IN NOISE DURING CONSTRUCTION	(SAME AS BF10A)	NO IMPACT
	K. QUALITY OF LIFE	REDUCED FLOODING WILL SUBSTANTIALLY IMPROVE THE QUALITY OF LIFE FOR THOSE AFFECTED	(SAME AS BF10A; SLIGHTLY BETTER)	ADVERSE IMPACTS FOR THOSE AFFECTED BY FLOODING

SOURCE: U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT

BAYOU MANCHAC

The Bayou Manchac Watershed is located in the southeastern corner of the parish and is a tributary of the Amite River. See Plate 2. This watershed encompasses about 12 square miles.

The watershed is mostly undeveloped with urban lands making up less than 25 percent of the watershed. Land use maps for 1972 and 1985 are shown on Plates 31 and 32 of Appendix J. There are approximately 150 residential and commercial structures within the watershed. The distribution of structures within the various floodplains is shown in Table 67. The approximate 10-year floodplain boundary is shown on Plate 10. Calculated existing project equivalent annual flood damages were estimated to be $337,000 per year in this watershed (Subbasin 64).

Flooding in this watershed is mostly backwater in nature. Some headwater flooding occurs, but is usually in conjunction with backwater problems resulting from high water levels in the Amite River.

POSSIBLE OPTIONS TO REDUCE FLOOD DAMAGES

Structural Measures

Detention/Retention Storage

Due to the lack of topographical relief in this watershed, detention/retention storage basins were determined to be impractical. Required basin containment structures, primarily earthen levees, in conjunction with land requirements would be excessive in order to achieve significant flow retention.

Channel Modifications

Due to the significant backwater effects of the Amite River, simple channel enlargement would not be effective in reducing flood stages in this watershed.

TABLE 67

BAYOU MANCHAC - DISTRIBUTION OF STRUCTURES WITHIN VARIOUS FLOODPLAINS

BASIN NO.	STRUCTURE CATEGORY	0-10 YEAR	10-25 YEAR	25-50 YEAR	50-100 YEAR	100-500 YEAR	ABOVE 500 YEAR	ALL FLOOD ZONES
	BAYOU MANCHAC							
64	1-STORY	38	40	42	10	30	107	267
	2-STORY	11	3	4	4	5	15	42
	MOBILE HOME	23	14	49	11	26	31	154
	APT.BLDGS.	39	125	101	10	54	39	368
	COMMERCIAL	8	22	11	45	112	82	280
	TOTAL	95	327	251	93	893	692	2351

SOURCE: U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT

Pumping Station/Diversion

Two pumping station options were investigated: one, blocking backwater flows by means of a levee and pumping through a barrier levee into Bayou Manchac; and two, diverting Bayou Manchac flows by pumping to the Mississippi River.

In the first option, the lack of topographic rise in this basin would require that the barrier levee be exceptionally long. That would make this plan very expensive and economically infeasible. The second plan, which would allow backwater into the basin and pump it to the Mississippi River, would require a very high capacity pumping station. This station would essentially have to pump down stages of the Amite River to be effective. A station of such capacity would also be cost prohibitive.

In addition to the above, a gravity flow diversion to the Mississippi River was considered. This plan would not be dependable since the Mississippi River water level is usually higher than the Amite River water level at Bayou Manchac even during Amite River flood events.

Nonstructural Measures

Nonstructural solutions for the Bayou Manchac area include ring levees around selected subdivisions, buy-out and relocation of structures subject to repetitive flooding. Almost all existing residential and commercial structures in the area are constructed on concrete slab foundation. Ring levees around selected subdivision could be economically favorable. Buy-out and relocation was also determined to be more costly than structural improvements providing comparable levels of flood damage reduction. While some nonstructural measures may be cost effective on an individual structure basis, a basis-wide plan was not developed for this watershed under the scope of this study.

No structural or nonstructural plans were developed for this watershed.

TENTATIVELY SELECTED PLAN

GENERAL

The effects of the proposed Comite River Diversion Canal, see page 7, were considered and are incorporated below. Since most of this watershed's flooding occurs under headwater conditions, calculated flood reduction benefits are not significantly changed with the Comite project in place. A cursory examination of the previous plan formulation, screening and selection process, incorporating the canal's effects, was performed. This investigation revealed that the proposed canal has no significant impact on the plan selection analysis and conclusion for this watershed. Comparative stage frequency data and flood reduction benefits for this watershed's Tentatively Selected Plan are shown in the Engineering and Economics appendices.

BLACKWATER BAYOU

Description

The tentatively selected plan for the Blackwater Bayou watershed consists of widening approximately 13 miles of the existing earthen channel of the main stem of Blackwater Bayou and its main tributary. Also included are proposed improvements to several bridges and culverts. Proposed modifications are designed to convey a 10-year storm event within streambank and reduce out-of-bank stages of larger flood events.

New channel slopes are designed 1 V on 3.5 H. Design bottom widths vary per stream reach. No significant changes are proposed to existing channel bottom elevation or slope. Proposed channel bottom width designs for each stream reach along with bridge and culvert modifications are listed in Table 68. Plates 42 and 43, respectively, show proposed channel modifications and relocations. Typical cross-sections for the plan are shown on Plate 47.

Plan Effectiveness

The tentatively selected plan is designed to convey and contain a 10-year storm event within the streambank. Flood stages of greater storm events will also be reduced. Expected stage lowerings for various storm events at selected locations in the watershed are shown in Table 69 and Plate 55. Overflow maps, illustrating existing and with project floodplains are shown in the Engineering Appendix C. The expected reduction in floodstages will result in a substantial lowering in the number of structures located in a 0-50 year floodplain (see Table 70).

By the year 2040, urbanization in this watershed is projected to increase from 31 to 40 percent. Estimates from hydrologic modelling indicate that the 10-year with project average stage will be about 0.3 feet higher and that there will be no appreciable difference in average 100-year flood stages. Implementation of a floodplain management program, that would not allow future development to significantly increase flood stages, would likely reduce these projected stage increases. The continued implementation and enforcement of East Baton

Rouge Parish's current floodplain ordinance (see Appendix K) will be satisfactory in this watershed.

TABLE 68

BLACKWATER BAYOU - TENTATIVELY SELECTED PLAN PROPOSED CHANNEL WIDTHS AND RELOCATIONS

CHANNEL	PROPOSED BOTTOM WIDTH	LOCATION
Blackwater Bayou		Improvements from Mouth to Greenwell Springs Road. 10 year earthen channel design
	varies	Mouth to Hooper Road (Minimal Work)
	35'BW	Hooper Road to Old Settlement Road
	improve bridge	Blackwater Road (lengthen 50 ft)
	remove bridge	Abandoned bridge at Crumholt Road (remove)
	improve bridge	Crumholt Road (lengthen 112 ft)
	improve bridge	Carey Road (lengthen 50 ft)
	improve bridge	Dyer Road (lengthen 35 ft)
	improve bridge	Blackwater Road (lengthen 45 ft)
	improve bridge	McCullough Road (lengthen 35 ft)
	15'BW	Old Settlement Road to Greenwell Springs Road
	improve culvert	Greenwell Springs Road (clean existing culvert)
Tributary #1	5' BW	Mouth to McCullough Road
	improve bridge	Core Lane (lengthen 16 ft)
Tributary #2	No Work	

Source: U.S. Army Corps of Engineers, New Orleans District

TABLE 69

BLACKWATER BAYOU - TENTATIVELY SELECTED PLAN
EXPECTED PROJECT STAGE REDUCTIONS (FT)
(WITH COMITE RIVER DIVERSION CANAL IN PLACE)

BLACKWATER BAYOU

Event	Hooper Road	Crumholt Road	Carey Road	Blackwater Road	Old Settlement
1-YR	2.3	3.3	4.8	2.9	2.3
2-YR	2.3	3.6	4.1	2.3	2.0
5-YR	2.3	3.2	3.5	1.9	1.6
10-YR	2.2	2.7	3.3	1.4	1.4
25-YR	2.7	2.5	3.2	1.1	0.6
50-YR	1.7	1.2	1.2	1.1	0.3
100-YR	1.5	1.4	1.0	1.0	0.3
200-YR	1.4	1.4	1.0	0.9	0.3
500-YR	1.2	1.3	1.0	0.6	0.3

TRIBUTARIES #1 AND #2

	Triburary #1			Tributary #2	
Private Event	2400 ft U/S Mouth	Gurney Road	Core Lane	U/S Mouth	LA Hwy 410
1-YR	1.5	2.3	1.2	1.0	0.0
2-YR	1.7	1.9	1.5	0.8	0.0
5-YR	2.0	1.6	2.0	0.6	0.0
10-YR	2.5	1.4	2.2	0.6	0.0
25-YR	2.2	1.2	1.9	0.6	0.0
50-YR	2.0	1.2	1.0	0.6	0.0
100-YR	1.8	1.2	0.6	0.6	0.0
200-YR	1.7	1.2	0.6	0.6	0.0
500-YR	1.5	1.2	0.5	0.5	0.0

SOURCE: U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT

TABLE 70

BLACKWATER BAYOU - NUMBER OF STRUCTURES LOCATED IN VARIOUS FLOODPLAINS
WITH AND WITHOUT THE TENTATIVELY SELECTED PLAN
(WITH COMITE RIVER DIVERSION CANAL IN PLACE)

BASIN NO.	STRUCTURE CATEGORY	0-10 YEAR	10-25 YEAR	25-50 YEAR	50-100 YEAR	100-500 YEAR	ABOVE 500 YEAR	ALL FLOOD ZONES
	WITHOUT PROJECT							
13	1-STORY	172	27	296	209	137	115	956
	2-STORY	20	2	12	9	2	5	50
	MOBILE HOME	4	4	20	10	15	108	161
	COMMERCIAL	10	4	16	8	7	11	56
	TOTAL	206	37	344	236	161	239	1,223
	WITH TENTATIVELY SELECTED PLAN							
	1-STORY	66	12	191	182	273	232	956
	2-STORY	8	0	17	10	8	7	50
	MOBILE HOME	1	0	13	11	12	124	161
	COMMERCIAL	1	1	15	10	10	19	56
	TOTAL	76	13	236	213	303	382	1,223

SOURCE: U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT

Design and Construction

Existing soils data from available sources were used in determining channel design slopes and possible erosion protection. A channel slope design of 1 V on 3.5 H was determined to be necessary to reasonably ensure bank stability. This design slope was determined to be applicable throughout the watershed.

Soils data reveal that some sands occur in scattered locations, and in varying layer thickness, throughout the watershed. From field investigations it was determined that where these sands occur, significant bank erosion is taking place. Proposed excavation in these locations would aggravate this condition without the addition of erosion protection. A preliminary erosion control system was designed and consists of a geosynthetic bank cover with toe-anchor rock (See detail on Plate 47). The extent of which this system is needed will not be known until site-specific soil borings are taken and analyzed. Changes to this design may also be warranted pending soil investigations. While erosion control may not be required for much of the channel, it is included in the design for the entire channel length as a "worst case" possibility.

Construction will basically consist of channel clearing and the excavation of approximately 518,000 cubic yards of material. This material will be disposed in the parish landfill located in the northwest corner of the parish about 9 miles, on average, from this watershed (see Plate 51). In some locations, the installation of the above described geosynthetic mat and rock will also be required.

The proposed work will likely be performed from the top of the bank and inside the channel by shovel and dragline heavy equipment. Once the purchase of required project right-of-way is complete, total accessibility along the top of the bank will be available. Overall, project constructability appears to be only moderately difficult.

It is estimated that project construction for this watershed will take about two years.

Relocations and Removals

Roadway and utility relocations required to implement the tentatively selected plan were determined as follows:

Item	Number of Relocations
Railroads	0
Roads and Bridges	8
Pipelines	5
Power and Communication Lines	0
Other	0

There are no new lands, easements, and/or rights-of-way required for relocation of affected utilities and/or facilities since the relocation can be accomplished in existing facility or utility rights-of-way, proposed project lands, or by elevating the pipelines.

Real Estate

The tentatively selected plan will require the purchase of 222 acres for channel construction, plus 127 acres for mitigation. No real estate purchase is necessary for disposal since the parish landfill will be used. No structures or other improvements, with the exception of some private culverts and bridge crossings, will be taken for this project. Land purchased for channel modifications will be perpetual drainage easements and mitigation areas will be bought outright in fee, not including mineral rights.

Several reaches of the main stem of Blackwater Bayou and its tributary cross private property tracts. In several locations, there exists some form of private access structure and few improvements on the tracts located across the stream. Land use is primarily pasture, agricultural, or vacant. Access structures connect to dirt roads and appear to be used mostly for tractor or on-foot crossings.

The proposed channel widening will, to some degree, sever or limit existing access to ten private property tracts that currently have bridge structures that cross the stream. As a means to cure this severance, either damage payments or

installation of a replacement bridge will occur. For each severed tract, a comparison of severance damage payment requirements and bridge replacement cost was made. In only two cases, it was determined that a replacement bridge is the cheaper option. For the remaining eight tracts, property damage payments were determined to be the least expensive cost to cure severance.

Mitigation

The mitigation feature of the tentatively selected plan consists of reforestation of 127 acres of existing cleared land. It was determined to be practicable to combine mitigation sites for the tentatively selected plan for all watersheds. Two sites will be utilized for mitigation. See Plates 52 and 53. The required 127 acres for this watershed's tentatively selected plan will be included as a portion of the entire habitat mitigation package for all five watersheds.

Recreation

The Blackwater watershed does not lend itself to much recreational development in association with the tentatively selected plan. While a bike path is a possibility along the widened channels, the fact that many of the channels go through individual private property tracts precludes this form of development. In addition there is no point of destination, such as a park or scenic development to attract bikers.

Aesthetics

For aesthetic purposes, a top-of-bank tree planting plan is proposed and consists of 13.5 miles of tree planting along both sides of Blackwater Bayou for a total of 27 miles. These plantings occur in areas of high impact relative to channel improvement involving clearing of top-of-bank vegetation. Replacing trees and shrubs lost during construction will return aesthetic conditions to the pre-project condition. Table 3 within Appendix E identifies tree and shrub requirements and costs.

Cultural Resources

Preliminary investigations have revealed that there exists one significant site (thought to be modified), one potentially significant recorded site, and one anticipated site located in the project area. There appears to be a moderate chance of uncovering other unknown sites. A more intensive investigation will be conducted prior to construction. Any sites found could likely be avoided by offsetting the proposed channel alignment. These efforts will be coordinated with the State Historic Preservation Office (SHPO).

Stream Gaging

The U.S. Geological Survey has an existing parish-wide stream gaging program that includes installations in this watershed. Improvements are proposed for gages at Hooper Road and Dyer Road. Data from these gages will be used in both the final project design and in monitoring the effectiveness of the project. Gages will be upgraded as part of this project construction and then will be maintained by the U.S. Geological Survey as part of their existing parish program.

Operation, Maintenance Repair, Replacement, and Rehab (O&M)

Required O&M for the channels consist of continuous inspection and debris removal, annual herbicide application, and clearing and snagging every 5 to 10 years, where necessary. Herbicide spraying would be conducted in accordance with the Environmental Protection Agency's guidelines. Maintenance of combined project mitigation areas is also necessary and such costs have been prorated to the overall O&M of this watershed's tentatively selected plan. Operation and maintenance of the above listed stream gages is also required as part of this plan.

Environmental and Social Effects

The only significant long term environmental impact of the tentatively selected plan is the destruction of 90 acres of bottomland hardwood forests. This loss will be mitigated with the planting and maintenance of 127 acres of existing cleared land. There will be minimal short term effects on stream water

quality during construction only. Aquatic habitat will receive adverse impacts from loss of diversity and increased in-stream temperature. The loss of screening vegetation along the channel banks would result in a significant aeshthtic loss. However, this loss would be mitigated by plantings of trees on both sides of 13.5 miles of channel.

The most significant beneficial social impacts of this plan would be the relief from flooding to those affected. Adverse social impacts include the taking of some unimproved private property. Temporary traffic rerouting for bridge relocations is also necessary during construction of the plan.

Economic Benefits

The tentatively selected plan would generate significant economic benefits from flood damage reduction to existing, and, to some extent, projected future development. Benefits were only quantified, however, for existing development. It is estimated that annual average damages in this watershed would be reduced by about 70 percent. A breakdown of these anticipated benefits are shown in Table 71.

Final Costs, Net Benefits

Costs and benefits for the tentatively selected plan were further developed and updated to include all features and items not included in the screening and selection process. In this estimate, a significant higher level of detail was given to construction considerations, real estate requirements, and indirect items such as project designs and management costs. The inclusion of potential erosion control measures and real estate severance and acquisition costs significantly increased the estimated project cost as compared to that used in the screening and selection process. Some reconsideration was given to the plan selection process and it was determined that this cost increase would be relatively the same for all other plans considered. It was therefore determined that no change in the plan selection was warranted by the increased final costs.

Final costs and benefits for the tentatively selected plan are shown in Table 71. Complete itemized costs by account code

feature are shown in Table 72. The total first cost of the tentatively selected plan, including all items, is estimated to be $21,640,000. Total tentatively selected plan annual operation and maintenance costs, including all features, is estimated at $64,000 per year. Project first costs were converted to equivalent annual dollars using an interest rate of 8.00 percent over a 50-year period. It has been determined that the most likely estimate of equivalent annual costs and benefits indicates that the tentatively selected plan will generate $1,888,000 per year net benefits. The benefit-cost ratio is 1.88 to 1.

Construction of each watershed's tentatively selected plan will be phased. Construction of the tentatively selected plan for Blackwater Bayou is scheduled to start in 2001. Fully-funded cost estimates in accordance with this construction schedule are shown in Plan Implementation.

Cost-Sharing

A breakdown of incremental and fully-funded cost-sharing requirements for the tentatively selected plan is shown in Plan Implementation. The local sponsor will be responsible in providing and/or bearing the full costs of all required lands, easements, rights-of-way, relocations, and disposal areas for this project. The local sponsor will also bear 100 percent of annual operation and maintenance, rehabilitation, and all replacement costs.

TABLE 71
BLACKWATER BAYOU
PROJECT COSTS AND BENEFITS FOR THE TENTATIVELY SELECTED PLAN
(1994 DOLLARS, 8.00% INTEREST, 50-YEAR PERIOD)

FIRST COSTS	
CONSTRUCTION FEATURE	$21,690,000
GROSS INVESTMENT (includes interest lost during construction)	$25,503,320
AVERAGE ANNUAL COSTS	
INTEREST/AMORTIZATION	$ 2,085,000
OPERATION/MAINTENANCE	$ 64,000
TOTAL AVERAGE ANNUAL COSTS	$ 2,149,000
AVERAGE ANNUAL BENEFITS*	
INUNDATION REDUCTION	$ 3,964,200
FIA COSTS SAVED	$ 8,350
REDUCED EMERGENCY COSTS	$ 34,200
FILL REDUCTION	$ 30,680
RECREATION	$ 0
EROSION CONTROL	$ 0
BENEFITS DURING CONSTRUCTION	$ 0
TOTAL AVERAGE ANNUAL BENEFITS	$ 4,037,430
BENEFIT/COST RATIO	1.88

* CALCULATED WITH PROPOSED COMITE RIVER DIVERSION CANAL IN PLACE

SOURCE: U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT

TABLE 72
BLACKWATER BAYOU - TENTATIVELY SELECTED PLAN
CHART OF ACCOUNTS

Account Code	Item	Quantity	Unit	Unit Price	Amount	Contingencies	Project Cost
01---	LANDS AND DAMAGES						
	Construction						
01B--	Acquisitions						
01B1-	By Government				7,580	1,900	9,480
01B2-	By Local Sponsor(LS)				103,820	25,960	129,780
01B4-	Review Of LS				6,120	1,530	7,650
01C--	Condemnations						
01C2	By LS				13,140	3,290	16,430
01C4-	Review of LS				3,480	870	4,350
01E--	Appraisals						
01E3-	By LS				103,000	25,710	128,710
01E5-	Review of LS				20,600	5,150	25,750
01G--	Temporary Permits						
01G1-	By Government				2,310	580	2,890
01G2-	By LS				8,360	2,070	10,430
01G4-	Review of LS				660	170	830
01R--	Real Estate Payments						
01R1-	Land Payments						
01R1B	By LS				898,000	225,000	1,123,000
01T--	LERRD Credits						
01T1-	Land Payments				6,490	1,620	8,110
01T2-	Administrative Costs				5,870	1,470	7,340
01T4-	All Other				3,400	850	4,250
01---	Subtotal: Lands And Damages (Construction)						1,182,830
	Contingencies						296,170
01---	Subtotal: Lands And Damages (Construction)						1,479,000
	Mitigation						
01B1-	By Government				1,090	280	1,370
01B2-	By Local Sponsor(LS)				1,710	430	2,140
01B4-	Review Of LS				320	80	400
01C--	Condemnations						
01C2	By LS				340	90	430
01C4-	Review of LS				150	40	190
01E--	Appraisals						
01E3-	By LS				1,700	430	2,130
01E5-	Review of LS				430	110	540
01F--	PL 91-646 Assistance				150	40	190
01F1-	By Government				50	10	60
01F4-	Review Of LS						
01G--	Temporary Permits						
01G1-	By Government				480	120	600
01G2-	By LS				680	170	850
01G4-	Review of LS				140	40	180
01R--	Real Estate Payments						
01R1-	Land Payments						
01R1B	By LS				283,250	71,320	354,570
01T--	LERRD Credits						
01T1-	Land Payments				770	190	960
01T3-	PL 91-646 Assistance				760	190	950

Account Code	Item	Quantity	Unit	Unit Price	Amount	Contingencies	Project Cost
01T2-	Administrative Costs				960	240	1,200
01T4-	Other				190	50	240
01---	Subtotal: Lands And Damages (Mitigation)						293,170
	Contingencies						73,830
01---	Subtotal: Lands And Damages (Mitigation)						367,000
01---	TOTAL: LANDS AND DAMAGES						1,846,000
02------	RELOCATIONS						
0201----	Roads, Construction Activities						
0201----	McCullough Road Bridge BW-2 2-Lane, Class-6 Road (Light Duty) Permanent Relocation	1	LS	154,960.00	154,960	38,717	193,677
0201----	Blackwater Road Bridge BW-3 (Med Duty) Permanent Relocation	1	LS	201,760.00	201,760	50,410	252,170
0201----	Dyer Road Bridge BW-4 2-Lane, Class-4 Road (Med Duty) Permanent Relocation	1	LS	215,200.00	215,200	53,767	268,967
0201----	Carey Road Bridge BW-5 2-Lane, Class-4 Road (Light Duty) Permanent Relocation	1	LS	167,840.00	167,840	41,934	209,774
0201----	Blackwater Road Bridge BW-6 2-Lane, Class-4 Road (Med Duty) Permanent Relocation	1	LS	269,040.00	269,040	67,220	336,260
0201----	Crumholt Road Bridge BW-10 2-Lane, Class-6 Road (Light Duty) Permanent Relocation	1	LS	176,480.00	176,480	44,094	220,574
0201----	Core Lane Bridge BW1-3 2-Lane, Class-6 Road (Light Duty) Permanent Relocation	1	LS	138,880.00	138,880	34,698	173,578
0201----	SUBTOTAL: Roads						1,324,160
	Contingencies						330,840
0201----	SUBTOTAL: Roads						1,655,000
0203----	Cemeteries, Utilities And Structures						
020318--	Utilities						
02031815	12" Petroleum Products Pipeline BW-8 Permanent Relocation	1	LS	60,240.00	60,240	15,162	75,402
02031815	18" Petroleum Products Pipeline BW-8A Permanent Relocation	1	LS	100,320.00	100,320	25,251	125,571
02031815	16" Petroleum Products Pipeline BW-9 Permanent Relocation	1	LS	88,480.00	88,480	22,270	110,750
02031815	16" Petroleum Products Pipeline BW1-6 Permanent Relocation	1	LS	102,480.00	102,480	25,797	128,277
0203----	SUBTOTAL: Cemeteries, Utilities And Structures						351,520
	Contingencies						88,480
0203----	SUBTOTAL: Cemeteries, Utilities And Structures						440,000
02------	TOTAL: RELOCATIONS						2,095,000
06------	FISH AND WILDLIFE FACILITIES						
0603----	Wildlife Facilities And Sanctuaries						
060301--	Mob And Demob						
060371--	Fences						
06037102	Fencing	6,203	LF	5.45	33,806	8,544	42,350

Account Code	Item	Quantity	Unit	Unit Price	Amount	Contingencies	Project Cost
060373--	Habitat And Feeding Facilities						
06037302	Planting	107	AC	150.00	16,050	3,600	19,650
06------	Subtotal: Fish And Wildlife Facilities						49,856
	Contingencies						12,144
06------	TOTAL: FISH AND WILDLIFE FACILITIES						62,000
09------	CHANNELS AND CANALS						
0901----	Channels						
090101--	Mob & Demob	Lump Sum	LS	150,000.00	150,000	29,777	179,777
09011502	Clearing For Channel Dredging	164	AC	5,900.00	967,600	192,146	1,159,746
09011502	Excavation	517,600	CY	5.10	2,639,760	524,201	3,163,961
09013002	Geotextile Mat						
	Turf reinforcement	887,000	SY	6.00	5,322,000	1,060,000	6,382,000
	R-90 Stone	137,800	TN	19.50	2,687,100	533,577	3,220,677
	Hydromulch	551,500	SY	0.25	137,875	27,379	165,254
	Excavation For Stone	141,400	CY	5.10	721,140	143,196	864,336
09013002	Fuseplug dams	Lump Sum	LS	102,000.00	102,000	20,249	122,249
09019906	Aesthetic Plantings						
	Aesthetic Tree Planting	5,700	EA	15.00	85,500	21,500	107,000
09------	SUBTOTAL: Channels And Canals						12,812,975
	Contingencies						2,552,025
09------	TOTAL: CHANNELS AND CANALS						15,365,000
29---	PROJECT COOPERATION AGREEMENTS						
29A--	Draft PCA						
29A1-	Real Estate Activities				600	100	700
29A9-	All Other				800	200	1,000
29B--	Final PCA and Financial Plan						
29B1-	Real Estate Activities				600	100	700
29B9-	All Other				800	200	1,000
29C--	PCA Negotiations						
29C1-	Real Estate Activities				500	100	600
29C1-	All Other				800	200	1,000
29---	Subtotal: Project Cooperation Agreements						4,100
	Contingecies						900
29---	TOTAL: PROJECT COOPERATION AGREEMENTS						5,000
30---	ENGINEERING AND DESIGN						
30C--	Design Memorandum				660,000	132,000	792,000
30CD-	HTRW Studies				55,000	5,000	60,000
30CF-	Cost Estimates				18,000	4,000	22,000
30CN-	VE Studies				30,000	6,000	36,000
30DA-	P&S				171,000	34,000	205,000
30DF-	Cost Estimates				14,000	3,000	17,000
30DN-	VE Studies				5,000	1,000	6,000
30DA-	P&S - Mitigation				23,000	5,000	28,000
30Q--	Construction And Supply Contract Award Activities				10,000	2,000	12,000
30DV-	Engineering During Construction				28,000	6,000	34,000
30E--	Engineering And Design Phase Project Management				86,000	17,000	103,000

Account Code	Item	Quantity	Unit	Unit Price	Amount	Contingencies	Project Cost
30Z--	Misc. Activities						
	Monitoring						
	Install Gages				12,000	2,000	14,000
	Preconstruction O&M For Gages				43,000	9,000	52,000
	PMO				58,000	12,000	70,000
	LMVD				13,000	3,000	16,000
30---	SUBTOTAL: Engineering And Design						1,226,000
	Contingencies						241,000
30---	TOTAL: ENGINEERING AND DESIGN						1,467,000
31---	CONSTRUCTION MANAGEMENT						
31B--	Contract Administration						
31B3-	Review And Approval of Contract Payments				24,000	5,000	29,000
31B4-	Contract Modifications				76,000	15,000	91,000
31B5-	Progress And Completion Reports				32,000	7,000	39,000
31B9-	All Other				107,000	21,000	128,000
31D--	Review of Shop Drawings						
31D0-	Review of Shop Drawings				19,000	4,000	23,000
31E--	Inspection & Qual. Assur.						
31E1-	Schedule Compliance				18,000	4,000	22,000
31E2-	Compliance Sampling And Testing				15,000	3,000	18,000
31E3-	Quality Surveys				47,000	9,000	56,000
31E4-	Title II Services				43,000	9,000	52,000
31E9-	All Other				281,000	56,000	337,000
31T--	Construction Phase Project Management				46,000	9,000	55,000
31---	SUBTOTAL: Construction Management						708,000
	Contingencies						142,000
31---	TOTAL: CONSTRUCTION MANAGEMENT						850,000
	TOTAL: BLACKWATER BAYOU						21,690,000

Risk and Uncertainty

A modified risk and uncertainty analysis was performed on calculated benefits and costs of the Tentatively Selected Plan. In general, statistical ranges used in this analysis were broad and were established primarily for the purposes of identifying the direction of change that may be expected due to known uncertainties. The single value estimates calculated above were, therefore, used as the basis for determining the utlimate cost-effectiveness of the plan.

Five items were identified as having potential major variance on the overall project's feasibility. These items and their estimated variance ranges are discussed below. Additional detail of the analysis can be found in Economics Appendix H.

- Stage Frequency Values.

  Without project (existing) and with project floodstage frequency values directly affect existing and with project calculated damage dollar values. Variances on both existing and with project stages were determined to be practicably within plus or minus 1.0 feet for all storm frequency events, for without project conditions and plus or minus 0.5 feet for with project conditions. See Engineering Appendix C. Damage values were recalculated incorporating this range. Applying the results, it is estimated that without project flood damages vary from minus $2,773,000 to plus $4,409,000 per year from the estimate. With project flood damages are estimated to vary from minus $530,000 to plus $479,000 per year from the single value estimate. Note that it was determined that there is likely to be some correlation between existing and with project stage frequency variance. A correlation factor of 0.5 was applied to this item in the "risk analysis" calculations described below.

- Structure Elevations.

  Variances in structure elevations directly affect both existing and with project calculated damage dollar values. Within practical limits, structure elevation variance was determined to be minus 0.5 to plus 0.5 feet. The calculated dollar value variance is minus $589,000 to plus $2,271,000 for existing annual damages, and, minus $530,000 to plus $479,000 for with project annual damages. Note that there is a direct correlation between existing and with project variances. A correlation factor of 1.0 was, therefore, applied to this item in the "risk analysis" calculations described below.

- Structure Valuation.

- Variances in the estimate of structure values also affects both existing and with project calculated damage dollar value. Structure value variance range is estimated at plus or minus 10 percent from the single value estimate. Applying these results, it is estimated that existing flood damages vary from minus $496,000 to plus $431,000 per year. With project flood damages range from minus $142,000 to plus $125,000. A correlation factor of 1.0 was applied to with and without project vaiances.

- Construction Costs.

  Estimated variances in calculated quantities, unit prices, constructability, and other factors were considered in calculating the channel construction cost estimate. The calculated cost range is from minus $6,500,000 to plus $2,220,000 relative to the single value estimate used for this item. Converting this range to equivalent annual dollars yields minus $650,000 to plus $222,000 per year.

- Erosion Control Measures.

  As stated above, the extent that erosion control measures (geosynthetic mat and rock) is needed

throughout the watershed is uncertain. For the purposes of this study, a worst case condition, i.e., the need for erosion control for the entire channel, was considered and used as the basis for the single value cost estimate for this item. Through field investigation it has been determined, however, that the need for erosion control may be significantly less extensive. The total channel length that may require erosion control measures could be less than 25 percent of the total. Since this item is discounted to a degree in the variance estimate of construction cost, it was determined that the variance for this specific feature should be minus 50 percent to plus 5 percent from the single value cost estimate. In first cost this range is from minus $5,000,000 to plus $500,000. Conversion to equivalent annual dollars yields a range of minus $500,000 to plus $50,000 per year.

The above uncertainty spreads were integrated with the single most likely value estimates for existing annual damages, with project damages and project costs. With the aid of "At Risk" computer software, probability ranges were calculated. The calculated probability distributions for project cost, benefits, net benefits, and benefit-to-cost ratio are illustrated in Figures 2 through 5.

The calculated expected values generated as compared to the single value estimates were determined as follows:

(EQUIVALENT ANNUAL)	SINGLE VALUE ESTIMATE	CALCULATED EXPECTED VALUE
PROJECT BENEFITS	$4,037,000	$5,153,000
PROJECT COSTS	$2,149,000	$1,856,000
NET BENEFITS	$1,888,000	$3,297,000
BENEFIT/COST RATIO	1.88	2.78
PROBABILITY OF PROJECT NET POSITIVE BENEFITS	N/A	99%

These results show an expected increase in project net benefits. This increase was due primarily to an expected reduction in project costs, specifically, costs for erosion control and private bridges.

Figure 2
Blackwater Bayou
Probability Distribution

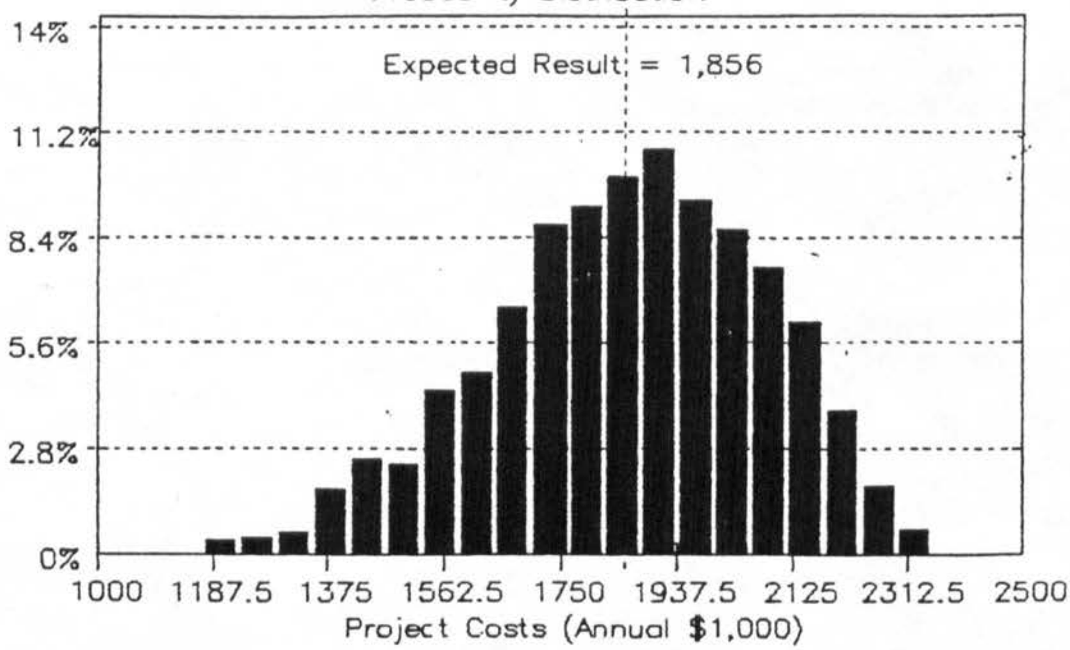


Figure 3
Blackwater Bayou
Probability Distribution

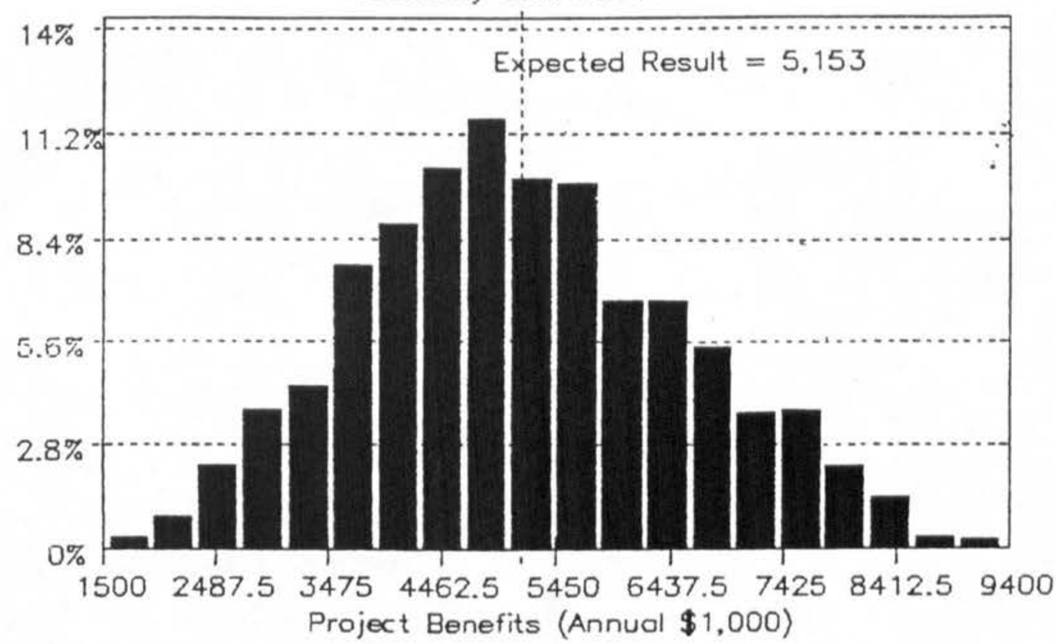


Figure 4
Blackwater Bayou
Probability Distribution

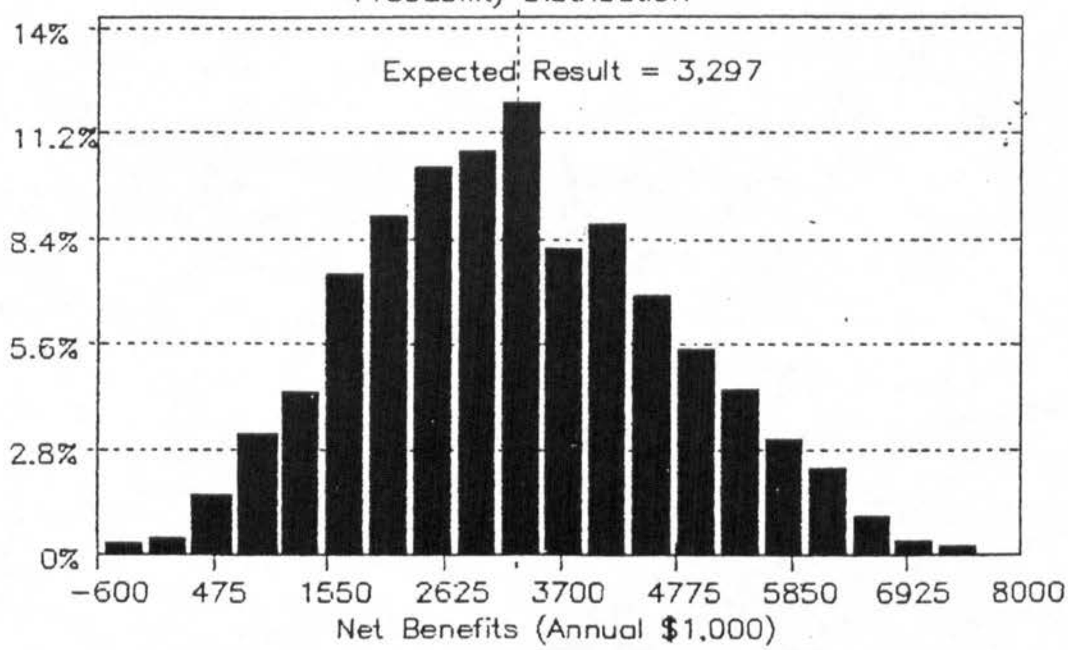
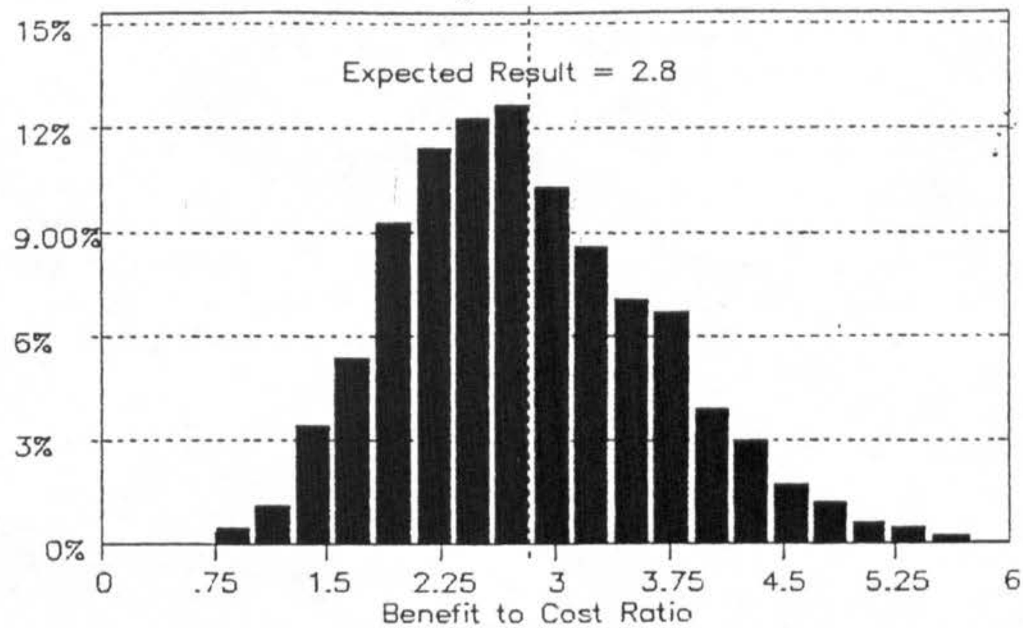


Figure 5
Blackwater Bayou
Probability Distribution



BEAVER BAYOU

Description

The tentatively selected plan for the Beaver Bayou watershed consists of widening approximately 8 miles of the existing earthen channel of the main stem of the Bayou. Also included are proposed improvements to several bridges and culverts. Proposed modifications are designed to convey a 25-year storm event within streambank and reduce out-of-bank stages of larger flood events.

New channel slopes are designed 1 V on 3.5 H. Design bottom widths vary per stream reach. No significant changes are proposed to existing channel bottom elevation or slope. Proposed channel bottom width designs for each stream reach along with bridge and culvert modifications are listed in Table 73. Plates 42 and 43, respectively, show proposed channel modifications and relocations.

Plan Effectiveness

The tentatively selected plan is designed to convey and contain a 25-year storm event within the streambank. Flood stages of greater storm events will also be reduced. Expected stage lowerings for various storm events at selected locations in the watershed are shown in Table 74 and Plate 56. Overflow maps, illustrating existing and with project floodplains are shown in the Engineering Appendix C. The expected reduction in floodstages will result in a substantial lowering in the number of structures located in 0-50 year floodplains (see Table 75).

By the year 2040, urbanization in this watershed is projected to increase from 36 to 50 percent. Estimates from hydrologic modelling indicate that the 10-year with project average stage will be about 0.2 feet higher and that there will be about 0.1 feet added difference in average 100-year flood stages. Implementation of a floodplain management program, that would not allow future development to significantly increase flood stages, would likely reduce these projected stage increases. The continued implementation and enforcement of East Baton Rouge Parish's floodplain ordinance (see Appendix K) will be satisfactory for this watershed.

TABLE 73

BEAVER BAYOU - TENTATIVELY SELECTED PLAN
PROPOSED CHANNEL WIDTHS AND RELOCATIONS

CHANNEL	PROPOSED BOTTOM WIDTH	LOCATION
Beaver Bayou		Improvements from Frenchtown Road to Hubbs Road. 25-year earthen channel design.
	20'BW	Frenchtown Road to 2300' d/s Greenwell Springs Road.
	50'BW	2300' d/s Greenwell Springs Road to Greenwell Springs Road.
	improve bridge	Greenwell Springs Road (lengthen 90 feet).
	50'BW	Greenwell Springs to Wax Road.
	improve bridge	Wax Road (lengthen 115 feet).
	50'BW	Wax Road to Hooper Road.
	30'BW	Hooper Road to Denham Road.
	5'BW	Denham Road to Hubbs Road.
Lateral Trib.	No Work	
Tributary #2	No Work	

Source: U.S. Army Corps of Engineers, New Orleans District

TABLE 74

BEAVER BAYOU - TENTATIVELY SELECTED PLAN
EXPECTED PROJECT STAGE REDUCTIONS (FT)
(WITH COMITE RIVER DIVERSION CANAL IN PLACE)

Beaver Bayou - Main Stem

Event	Frenchtown Road	Greenwell Springs Rd.	Wax Road	Hooper Road	Denham Road	Hubbs Road
1-YR	0.0	3.1	3.2	4.5	4.2	1.4
2-YR	0.0	3.1	3.0	4.1	3.8	1.4
5-YR	0.0	3.2	2.7	3.7	3.4	1.2
10-YR	0.0	3.0	2.7	3.2	3.1	1.1
25-YR	0.0	3.2	2.6	3.0	2.8	1.0
50-YR	0.0	3.0	2.6	2.6	2.5	0.8
100-YR	0.0	2.7	2.6	1.8	2.2	0.8
200-YR	0.0	2.6	2.3	1.3	2.1	0.8
500-YR	0.0	2.6	1.8	1.3	2.0	0.7

Beaver Bayou Lateral and Tributary #2

	Beaver Bayou Lateral			Tributary #2		
Event	Mouth	Devall Road	Near Puckett	Mouth	Devall Road	Near Core Ln
1-YR	3.0	0.7	0.0	3.7	0.0	0.0
2-YR	2.6	0.7	0.0	3.1	0.0	0.0
5-YR	2.5	0.6	0.0	2.7	0.0	0.0
10-YR	2.4	0.4	0.0	2.6	0.0	0.0
25-YR	2.3	0.3	0.0	1.2	0.0	0.0
50-YR	2.1	0.3	0.0	1.0	0.0	0.0
100-YR	1.8	0.3	0.0	0.9	0.0	0.0
200-YR	1.8	0.2	0.0	0.8	0.0	0.0
500-YR	1.5	0.1	0.0	0.8	0.0	0.0

Source: U.S. Army Corps of Engineers, New Orleans District

TABLE 75

BEAVER BAYOU
NUMBER OF STRUCTURES LOCATED IN THE VARIOUS FLOODPLAINS
WITH AND WITHOUT THE TENTATIVELY SELECTED PLAN
(WITH COMITE RIVER DIVERSION CANAL IN PLACE)

BASIN NO.	STRUCTURE CATEGORY	0-10 YEAR	10-25 YEAR	25-50 YEAR	50-100 YEAR	100-500 YEAR	ABOVE 500 YEAR	ALL FLOOD ZONES
	WITHOUT PROJECT							
14	1-STORY	312	72	16	100	71	676	1,247
	2-STORY	14	2	1	1	7	28	53
	MOBILE HOME	9	17	6	9	14	197	252
	COMMERCIAL	94	7	2	4	5	135	247
	TOTAL	429	98	25	114	97	1,036	1,799
	WITH TENTATIVELY SELECTED PLAN							
	1-STORY	133	22	71	49	151	821	1,247
	2-STORY	7	0	2	2	3	39	53
	MOBILE HOME	5	0	2	2	8	233	252
	COMMERCIAL	18	2	3	7	6	211	247
	TOTAL	163	26	78	60	168	1,304	1,799

SOURCE: U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT

Design and Construction

Existing soils data from available sources were used in determining channel design slopes and possible erosion protection. A channel slope design of 1 V on 3.5 H was determined to be necessary to reasonably ensure bank stability. This design slope was determined to be applicable throughout the watershed.

Soils data reveal that some sands occur in scattered locations, and in varying layer thickness, throughout the watershed. From field investigations it was determined that where these sands occur, significant bank erosion is taking place. Proposed excavation in these locations would aggravate this condition without the addition of erosion protection. A

preliminary erosion control system was designed and consists of a geosynthetic bank cover with toe-anchor rock (see detail on Plate 47). The extent of which this system is needed will not be known until site-specific soil borings are taken and analyzed. Changes to this design may also be warranted pending soil investigations. While erosion control may not be required for much of the channel, it is included in the design for the entire channel length as a "worst case" possibility.

Construction will basically consist of channel clearing and the excavation of approximately 695,000 cubic yards of material. This material will be disposed in the parish landfill located in the northwest corner of the parish about 14 miles, on average, from this watershed. In some locations, the installation of the above described geosynthetic mat and rock will also be required.

The proposed work will likely be performed from the top of the bank and inside the channel by shovel and dragline heavy equipment. Once the purchase of required project right-of-way is complete, total accessibility along the top of the bank will be available. Overall, project constructability appears to be only moderately difficult.

It is estimated that project construction for this watershed will take about two years.

Relocations and Removals

Roadway and utility relocations required to implement the tentatively selected plan were determined as follows:

Item	Number of Relocations
Railroads	0
Roads and Bridges	2
Pipelines	12
Power and Communication Lines	0
Other	0

There are no new lands, easements, and/or rights-of-way required for relocation of affected utilities and/or facilities since the relocation can be accomplished in existing facility

or utility rights-of-way, proposed project lands, or by elevating the pipelines.

Real Estate

The tentatively selected plan will require the purchase of 134 acres for channel construction, plus 122 acres for mitigation. No real estate purchase is necessary for disposal since the parish landfill will be used. No structures or other improvements, with the exception of some private culverts, bridge crossings, and one bulkhead, will be taken for this project. Land purchased for channel modifications will be perpetual drainage easements and mitigation areas will be bought outright in fee, excluding mineral rights.

Much of the main stem of Beaver Bayou segment private property tracts. In several locations, there exists some form of private access structure and few improvements on the tracts located across the stream. Land use is primarily pasture, agricultural, or vacant. Access structures connect to dirt roads and appear to be used for tractor or on-foot crossings.

The proposed channel widening will, to some degree, sever or limit existing access to nine private property tracts that currently have bridge structures that cross the stream. As a means to cure this severance, either damage payments or installation of a replacement bridge will occur. For each severed tract, a comparison of severance damage payment requirements and bridge replacement cost was made. In four cases, it was determined that a replacement bridge is the cheaper option. For the remaining five tracts, property damage payments were determined to be the least expensive cost to cure severance.

Mitigation

The mitigation feature of the tentatively selected plan consists of reforestation of 122 acres of existing cleared land. It was determined to be practicable to combine mitigation sites for the tentatively selected plan for all watersheds. Two sites will be utilized for mitigation. See Plates 52 and 53. The required 122 acres for this watershed's

tentatively selected plan will be included as a portion of the entire mitigation package for all five watersheds.

Recreation

The Beaver Bayou watershed does not lend itself to much recreational development in association with the tentatively selected plan. While a bike path is a possibility along the widened channels, the fact that many of the channels go through individual private property tracts precludes this form of development. In addition there is no point of destination, such as a park or scenic development to attract bikers.

Aesthetics

For aesthetic purposes, a top-of-bank tree replanting plan is proposed and consists of 7.8 miles of tree and shrub line planting along both sides of Beaver Bayou for a total of 15.6 miles. These plantings occur in areas of impact relative to channel improvement involving clearing of top-of-bank vegetation. Replacing trees and shrubs lost during construction will return aesthetic conditions to the pre-project condition. See Table 3 of the Environmental Appendix which identifies tree and shrub requirements and cost per watershed.

Cultural Resources

Previous channel work on Beaver Bayou impacted two sites. Preliminary investigations indicate that no other significant cultural resources will likely be impacted by the tentatively selected plan and that the project area is considered to have a low probability for containing such sites. A more intensive investigation prior to construction is required however. Any sites found could likely be avoided by offsetting the proposed channel alignment. These efforts will be coordinated with the State Historic Preservation officer (SHPO).

Stream Gaging

The U.S. Geological Survey has an existing parish-wide stream gaging program that includes installations in this watershed. Improvements are proposed for gages located at

Hooper, Wax, and Frenchtown Roads. Data from these gages will be used in both the final project design and in monitoring the effectiveness of the project. Gages will be upgraded as part of this projects's construction and then will be maintained by the U.S. Geological Survey as part of their existing parish program.

Operation, Maintenance Repair, Replacement, and Rehab (O&M)

Required O&M for the channels consist of continuous inspection and debris removal, annual herbicide application, and clearing and snagging every 5 to 10 years, where necessary. Herbicide spraying would be conducted in accordance with the Environmental Protection Agency's guidelines. Maintenance of combined project mitigation areas is also necessary and such costs have been prorated to the overall O&M of this watershed's tentatively selected plan. Operation and maintenance of the above listed stream gages is also required as part of this plan.

Environmental and Social Effects

The only significant long term environmental impact of the tentatively selected plan is the destruction of 86 acres of bottomland hardwood forestation. This loss will be mitigated with the planting and maintenance of 122 acres of existing cleared land, which in turn, are permanently lost. There will be minimal short term effects on stream water quality during construction only. Aquatic habitat will receive adverse impacts from reduced diversity and increased in-stream temperatures. The loss of screening vegetation along the channel banks would result in a significant aesthetic loss. However, this loss would be mitigated by plantings of trees on both sides of 7.6 miles of channel.

The most significant beneficial social impacts of this plan would be the relief from flooding to those affected. Adverse social impacts include the taking of some unimproved private property. Temporary traffic rerouting for bridge relocations is also necessary during construction of the plan.

Economic Benefits

The tentatively selected plan would generate significant economic benefits from flood damage reduction to existing, and, to some extent, projected future development. Benefits were only quantified, however, for existing development. It is estimated that annual average damages in this watershed would be reduced by about 85 percent. A breakdown of these anticipated benefits are shown in Table 76.

Final Costs, Net Benefits

Costs and benefits for the tentatively selected plan were further developed and updated to include all features and items not included in the screening and selection process. In this estimate, a significant higher level of detail was given to construction considerations, real estate requirements, and indirect items such as project designs and management costs. The inclusion of potential erosion control measures and real estate severance and acquisition costs significantly increased the estimated project cost as compared to that used in the screening and selection process. Some reconsideration was given to the plan selection process and it was determined that this cost increase would be relatively the same for all other plans considered. It was therefore determined that no change in the plan selection was warranted by the increased final costs.

Final costs and benefits for the tentatively selected plan are shown in Table 76. Complete itemized costs by account code feature are shown in Table 77. The total first cost of the tentatively selected plan, including all items, is estimated to be $20,590,000 Total tentatively selected plan annual operation and maintenance costs, including all features, is estimated at $2,034,000 per year. Project first costs were converted to equivalent annual dollars using an interest rate of 8.00 percent over a 50-year period. It has been determined that the estimated annual costs and benefits indicates that the tentatively selected plan will generate $6,745,000 per year net benefits. The benefit-cost ratio is 4.32 to 1.

Construction of each watershed's tentatively selected plan will be phased. Construction of the tentatively selected plan

for Beaver Bayou is scheduled to start in 2000. Fully-funded cost estimates in accordance with this construction schedule are shown in Plan Implementation.

Cost-Sharing

A breakdown of incremental and fully-funded cost-sharing requirements for the tentatively selected plan is shown in Plan Implementation. The local sponsor will be responsible in providing and/or bearing the full costs of all required lands, easements, rights-of-way, relocations, and disposal areas for this project. The local sponsor will also bear 100 percent of annual operation and maintenance, and, all replacement costs.

TABLE 76
BEAVER BAYOU
PROJECT COSTS AND BENEFITS FOR THE TENTATIVELY SELECTED PLAN
(1993 DOLLARS, 8.00% INTEREST, 50-YEAR PERIOD)

FIRST COSTS	
CONSTRUCTION FEATURE	$20,590,000
GROSS INVESTMENT (includes interest lost during construction)	$24,104,180
AVERAGE ANNUAL COSTS	
INTEREST/AMORTIZATION	$ 1,970,000
OPERATION/MAINTENANCE	$ 64,000
TOTAL AVERAGE ANNUAL COSTS	$ 2,034,000
AVERAGE ANNUAL BENEFITS*	
INUNDATION REDUCTION	$ 8,521,900
FIA COSTS SAVED	$ 18,610
REDUCED EMERGENCY COSTS	$ 58,600
FILL REDUCTION	$ 180,140
RECREATION	$ 0
EROSION CONTROL	$ 0
BENEFITS DURING CONSTRUCTION	$ 0
TOTAL AVERAGE ANNUAL BENEFITS	$ 8,779,250
BENEFIT/COST RATIO	4.32

* CALCULATED WITH PROPOSED COMITE RIVER DIVERSION CANAL IN PLACE

SOURCE: U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT

TABLE 77
BEAVER BAYOU - TENTATIVELY SELECTED PLAN
CHART OF ACCOUNTS

Account Code	Item	Quantity	Unit	Unit Price	Amount	Contingencies	Project Cost
01---	LANDS AND DAMAGES						
	Construction						
01B--	Acquisitions						
01B1-	By Government				7,580	1,900	9,480
01B2-	By Local Sponsor(LS)				103,820	25,850	129,670
01B4-	Review Of LS				6,180	1,550	7,730
01C--	Condemnations						
01C2	By LS				12,220	3,040	15,260
01C4-	Review of LS				3,610	900	4,510
01E--	Appraisals						
01E3-	By LS				103,000	25,750	128,750
01E5-	Review of LS				20,600	5,130	25,730
01G--	Temporary Permits						
01G1-	By Government				2,310	580	2,890
01G2-	By LS				8,360	2,090	10,450
01G4-	Review of LS				660	170	830
01R--	Real Estate Payments						
01R1-	Land Payments						
01R1B	By LS				898,000	225,000	1,123,000
01T--	LERRD Credits						
01T1-	Land Payments				6,490	1,620	8,110
01T2-	Administrative Costs				5,870	1,470	7,340
01T4-	Other				3,400	850	4,250
01---	Subtotal: Lands And Damages (Construction)						1,182,100
	Contingencies						295,900
01---	Subtotal: Lands And Damages (Construction)						1,478,000
	Mitigation						
01B1-	By Government				1,230	310	1,540
01B2-	By Local Sponsor(LS)				1,930	480	2,410
01B4-	Review Of LS				360	90	450
01C--	Condemnations						
01C2	By LS				380	100	480
01C4-	Review of LS				170	40	210
01E--	Appraisals						
01E3-	By LS				1,920	480	2,400
01E5-	Review of LS				480	120	600
01F--	PL 91-646 Assistance						
01F1-	By Government				170	40	210
01F4-	Review Of LS				70	20	90
01G--	Temporary Permits						
01G1-	By Government				540	140	680
01G2-	By LS				770	190	960
01G4-	Review of LS				150	40	190
01R--	Real Estate Payments						
01R1-	Land Payments						
01R1B	By LS				319,300	79,700	399,000
01T--	LERRD Credits						
01T1-	Land Payments				860	220	1,080
01T3-	PL 91-646 Assistance				860	220	1,080

Account Code	Item	Quantity	Unit	Unit Price	Amount	Contingencies	Project Cost
01T2-	Administrative Costs				1,080	270	1,350
01T4-	Other				220	50	270
01---	Subtotal: Lands And Damages (Mitigation)						330,490
	Contingencies						82,510
01---	Subtotal: Lands And Damages (Mitigation)						413,000
01---	TOTAL: LANDS AND DAMAGES						1,891,000
02------	RELOCATIONS						
0201----	Roads, Construction Activities						
0201----	La Hwy #408 (Hooper Road) BB-10 2-Lane, Class-4 Road (Med Duty) Permanent Relocation	1	LS	325,000.00	325,000	81,569	406,569
0201----	Wax Road Culverts BB-14 2-Lane, Class-4 Road (Med Duty) Permanent Relocation	1	LS	315,000.00	315,000	79,059	394,059
0201----	La Hwy #37 Bridge BB-19 2-Lane, Class-4 Road (Med Duty) Permanent Relocation	1	LS	380,000.00	380,000	95,372	475,372
0201----	SUBTOTAL: Roads						1,020,000
	Contingencies						256,000
0201----	SUBTOTAL: Roads						1,276,000
0203----	Cemeteries, Utilities And Structures						
020318--	Utilities						
02031815	3" Gas Pipeline BB-9 Permanent Relocation	1	LS	75,200.00	75,200	18,929	94,129
02031815	4" Gas Pipeline BB-12 Permanent Relocation	1	LS	84,000.00	84,000	21,144	105,144
02031815	5" Water Line BB-13 Permanent Relocation	1	LS	67,200.00	67,200	16,916	84,116
02031815	4" Gas Pipeline BB-16 Permanent Relocation	1	LS	80,000.00	80,000	20,138	100,138
02031815	6" Gas Pipeline BB-17 Permanent Relocation	1	LS	80,800.00	80,800	20,339	101,139
02031815	8" Water Line BB-18 Permanent Relocation	1	LS	66,400.00	66,400	16,714	83,114
02031815	5" Water Line BB-21 Permanent Relocation	1	LS	96,640.00	96,640	24,326	120,966
02031815	4" Gas Pipeline BB-22 Permanent Relocation	1	LS	112,000.00	112,000	28,254	140,254
0203----	SUBTOTAL: Cemeteries, Utilities And Structures						662,240
	Contingencies						166,760
0203----	SUBTOTAL: Cemeteries, Utilities And Structures						829,000
02------	TOTAL: RELOCATIONS						2,105,000
06------	FISH AND WILDLIFE FACILITIES						
0603----	Wildlife Facilities And Sanctuaries						
060301--	Mob And Demob						
060371--	Fences						
06037102	Fencing	7,121	LF	5.45	38,809	9,999	48,808
060373--	Habitat And Feeding Facilities						
06037302	Planting	123	AC	150.00	18,450	4,742	23,192

Account Code	Item	Quantity	Unit	Unit Price	Amount	Contingencies	Project Cost
06------	Subtotal: Fish And Wildlife Facilities						57,259
	Contingencies						14,741
06------	TOTAL: FISH AND WILDLIFE FACILITIES						72,000
09------	CHANNELS AND CANALS						
0901----	Channels						
090101--	Mob & Demob	Lump Sum	LS	220,000.00	220,000	43,444	263,444
09011502	Clearing For Channel Dredging	220	AC	5,900.00	1,298,000	256,321	1,554,321
09011502	Excavation	695,000	CY	5.60	3,892,000	768,567	4,660,567
09013002	Geotextile Mat						
	Turf Reinforcement	545,100	SY	6.00	3,270,600	645,927	3,916,527
	R-90 Stone	130,200	TN	18.50	2,408,700	475,655	2,884,355
	Hydromulch	322,400	SY	0.25	80,600	15,916	96,516
	Excavation For Stone	115,700	CY	5.60	647,920	127,947	775,867
09013002	Fuseplug dams	Lump Sum	LS	78,000.00	78,000	15,403	93,403
09019906	Aesthetic Plantings						
	Tree Planting	4,500	EA	15.00	67,500	16,500	84,000
09------	SUBTOTAL: Channels And Canals						11,963,320
	Contingencies						2,365,680
09------	TOTAL: CHANNELS AND CANALS						14,329,000
29---	PROJECT COOPERATION AGREEMENTS						
29A--	Draft PCA						
29A1-	Real Estate Activities				600	100	700
29A9-	All Other				800	200	1000
29B--	Final PCA and Financial Plan						
29B1-	Real Estate Activities				600	100	700
29B9-	All Other				800	200	1,000
29C--	PCA Negotiations						
29C1-	Real Estate Activities				500	100	600
29C9-	All Other				800	200	1,000
29---	Subtotal: Project Cooperation Agreements						4,100
	Contingecies						900
29---	TOTAL: PROJECT COOPERATION AGREEMENTS						5,000
30---	ENGINEERING AND DESIGN						
30C--	Design Memorandum				571,000	114,000	685,000
30CD-	HTRW Studies				136,000	14,000	150,000
30CF-	Cost Estimates				18,000	4,000	22,000
30GD-	VE Studies				30,000	6,000	36,000
30DA-	P&S				174,000	35,000	209,000
30DF-	Cost Estimates				14,000	3,000	17,000
30DN-	VE Studies				5,000	1,000	6,000
30DA-	P&S - Mitigation				29,000	6,000	35,000
30DS-	Construction Contract Award Activities				10,000	2,000	12,000
30DV-	Engineering During Construction				30,000	6,000	36,000
30E--	Engineering And Design Phase Project Management				87,000	17,000	104,000
30Z--	Misc. Activities						
	Monitoring						
	Install Gages				15,000	3,000	18,000
	Preconstruction O&M For Gages				63,000	13,000	76,000

Account Code	Item	Quantity	Unit	Unit Price	Amount	Contingencies	Project Cost
	PMO				58,000	12,000	70,000
	LMVD				10,000	2,000	12,000
30---	SUBTOTAL: Engineering And Design						1,250,000
	Contingencies						238,000
30---	TOTAL: ENGINEERING AND DESIGN						1,488,000
31---	CONSTRUCTION MANAGEMENT						
31B--	Contract Administration						
31B3-	Review And Approval of Contract Payments				18,000	4,000	22,000
31B4-	Contract Modifications				62,000	12,000	74,000
31B5-	Progress And Completion Reports				27,000	5,000	32,000
31B9-	All Other				88,000	18,000	106,000
31D--	Review of Shop Drawings						
31D0-	Review of Shop Drawings				15,000	3,000	18,000
31E--	Inspection & Qual. Assur.						
31E1-	Schedule Compliance				14,000	3,000	17,000
31E2-	Compliance Sampling And Testing				12,000	2,000	14,000
31E3-	Quality Surveys				36,000	7,000	43,000
31E4-	Title II Services				38,000	8,000	46,000
31E9-	All Other				219,000	44,000	263,000
31T--	Construction Phase Project Management				54,000	11,000	65,000
31---	SUBTOTAL: Construction Management						583,000
	Contingencies						117,000
31---	TOTAL: CONSTRUCTION MANAGEMENT						700,000
	TOTAL: BEAVER BAYOU						20,590,000

Risk and Uncertainty

A modified risk and uncertainty analysis was performed on calculated benefits and costs of the Tentatively Selected Plan. In general, statistical ranges used in this analysis were broad and were established primarily for the purposes of identifying the direction of change that may be expected due to known uncertainties. The single value estimates calculated above were, therefore, used as the basis for determining the ultimate cost-effectiveness of the plan.

Five items were identified as having potential major variance on the overall project's feasibility. These items and their estimated variance ranges are discussed below. Additional detail of the analysis can be found in the Economics Appendix H.

- Stage Frequency Values.

  Without project (existing) and with project floodstage frequency values directly affect existing and with project calculated damage dollar values. Variances on both existing and with project stages were determined to be practicably within plus or minus 1.0 feet for all storm frequency events for without project conditions, and, plus or minus 0.5 feet for with project conditions. See Engineering Appendix C. Damage values were recalculated incorporating this range. Applying the results, it is estimated that without project flood damages vary from minus $4,798,000 to plus $6,606,000 per year from the estimate. With project flood damages are estimated to vary from minus $535,000 to plus $536,000 per year from the single value estimate. Note that it was determined that there is likely to be some correlation between existing and with project stage frequency variance. A correlation factor of 0.5 was applied to this item in the "risk analysis" calculations described below.

- Structure Elevations.

  Variances in structure elevations directly affect both existing and with project calculated damage dollar values. Within practical limits, structure elevation variance was determined to be minus 0.5 to plus 0.5 feet. The calculated dollar value variance is minus $2,350,000 to plus $3,305,000 for existing annual damages, and, minus $536,000 to plus $535,000 for with project annual damages. Note that there is a direct correlation between existing and with project variances. A correlation factor of 1.0 was, therefore, applied to this item in the "risk analysis" calculations described below.

- Structure Valuations.

  Variances in the estimate of structure values also affect both existing and with project calculated damage dollar value. Structure value variance range is estimated at plus or minus 10 percent from the single vaule estimate. Applying these results, it is estimated that existing flood damages vary from minus $881,000 to plus $876,000 per year. With project flood damages range from minus $107,000 to plus $106,000. A correlation factor of 1.0 is applicable to this set of values.

- Construction Costs.

  Estimated variances in calculated quantities, unit prices, constructability, and other factors were considered in calculating the channel construction cost estimate. The calculated cost range is from minus $7,380,000 to plus $2,070,000 relative to the single value estimate used for this item. Converting this range to equivalent annual dollars yields minus $738,000 to plus $207,000 per year.

- Erosion Control Measures.

  As stated above, the extent that erosion control measures (geosynthetic mat and rock) is needed throughout the watershed is uncertain. For the purposes of this study, a worst case condition, i.e., the need for erosion control for the entire channel, was considered and used as the basis for the most likely cost estimate for this item. Through field investigation it has been determined, however, that the need for erosion control may be significantly less extensive. The total channel length that may require erosion control measures could be less than 25 percent of the total. Since this item is discounted to a degree in the variance estimate of construction cost, it was determined that the variance for this specific feature should be minus 50 percent to plus 5 percent from the single value cost estimate. In first cost this range is from minus $3,000,000 to plus $300,000. Conversion to equivalent annual dollars yields a range of minus $300,000 to plus $30,000 per year.

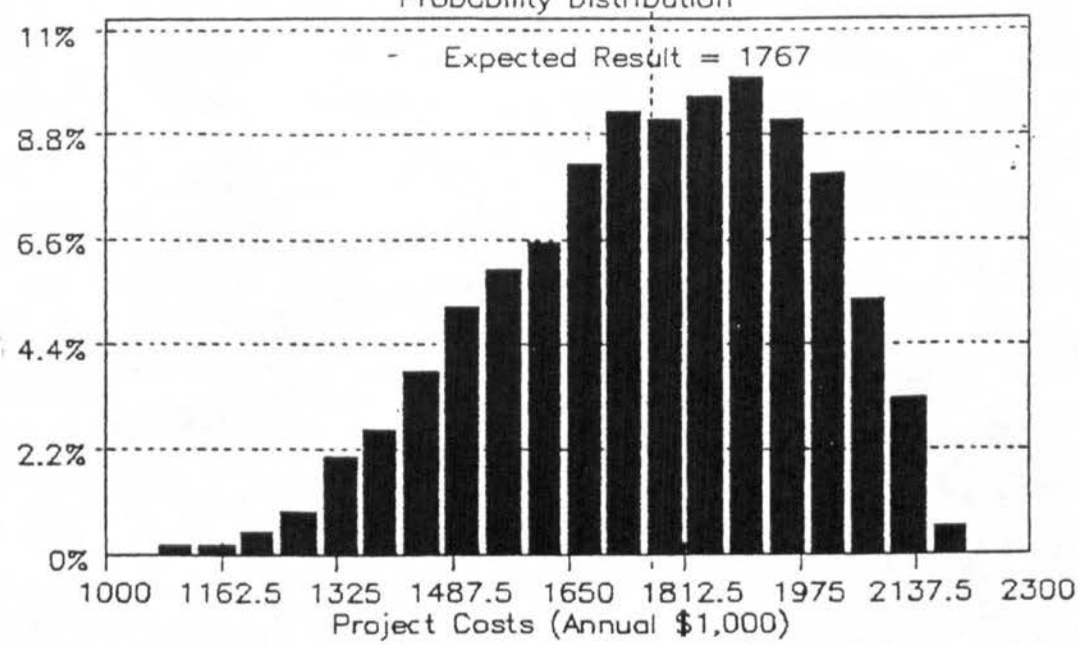
The above uncertainty spreads were integrated with the single most likely value estimates for existing annual damages, with project damages and project costs. With the aid of "At Risk" computer software, probability ranges were calculated. See Risk Analysis calculations in Economics Appendix H. The calculated probability distributions for project cost, benefits, net benefits, and benefit-to-cost ratio are illustrated in Figures 6 through 9.

The calculated expected values generated as compared to the single value estimates were determined as follows:

(EQUIVALENT ANNUAL)	SINGLE VALUE ESTIMATE	CALCULATED EXPECTED VALUE
PROJECT BENEFITS	$8,779,000	$9,719,000
PROJECT COSTS	$2,034,000	$1,767,000
NET BENEFITS	$6,745,000	$7,952,000
BENEFIT/COST RATIO	4.32	5.59
PROBABILITY OF PROJECT NET POSITIVE BENEFITS	N/A	99%

These results show an expected increase in project net benefits. This increase was due primarily to an expected reduction in project costs, specifically, costs for erosion control and private bridges.

Figure 6
Beaver Bayou
Probability Distribution



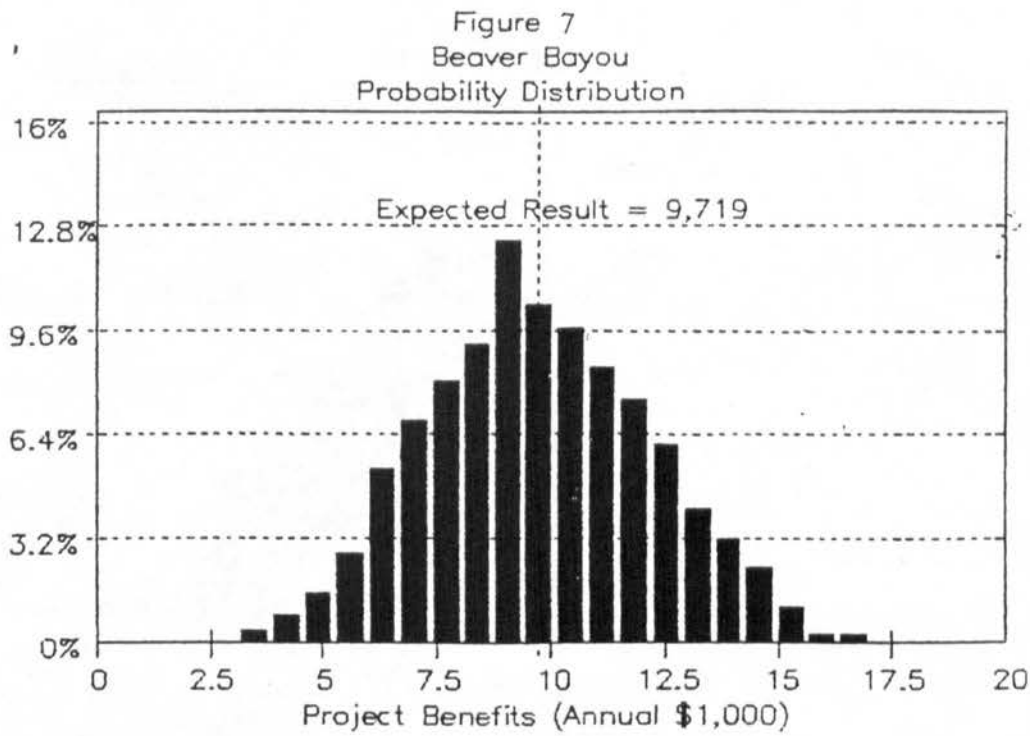


Figure 7
Beaver Bayou
Probability Distribution
16%
12.8%
9.6%
6.4%
3.2%
0%
Expected Result = 9,719
0
2.5
5
7.5
10
12.5
15
17.5
20
Project Benefits (Annual $1,000)

Figure 8
Beaver Bayou
Probability Distribution

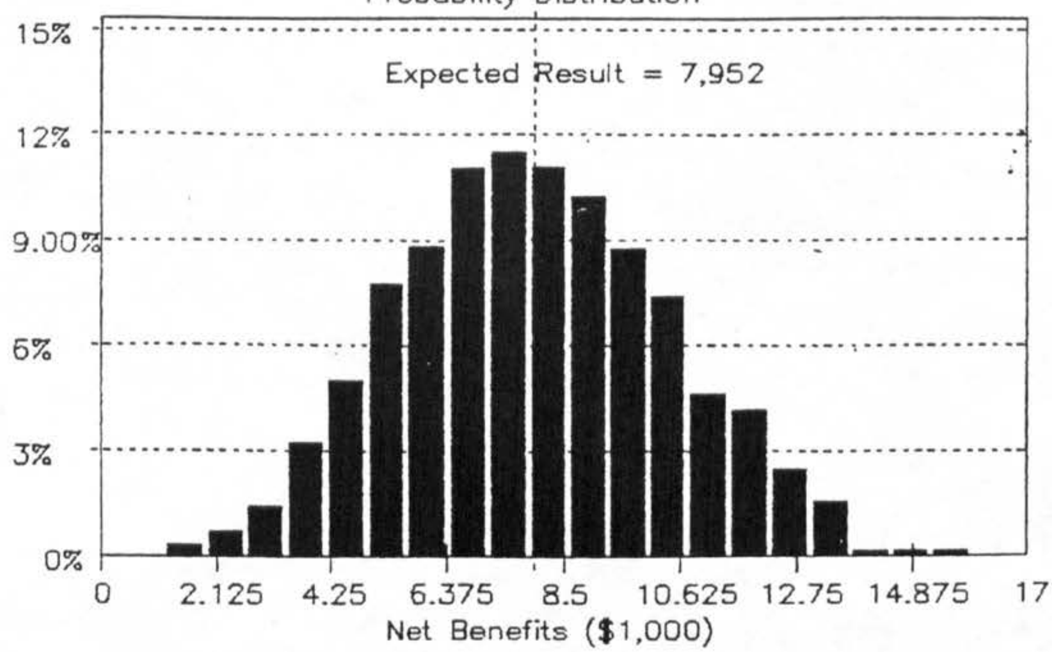
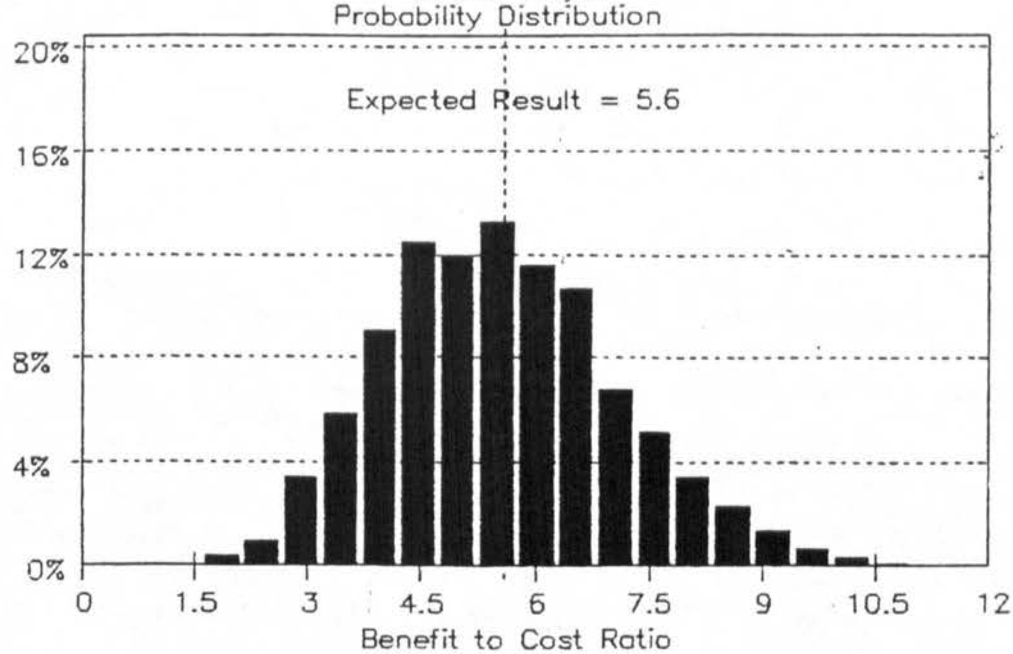


Figure 9
Beaver Bayou
Probability Distribution



JONES CREEK

Description

The tentatively selected plan for the Jones Creek watershed consists of clearing, reshaping, and concrete lining approximately 19 miles of the main stem of Jones Creek and its main tributaries - Lively Bayou, Lively Bayou Tributary, and Weiner Creek. Clearing and snagging of lower Jones Creek, below Jones Creek Road to the channel's mouth is also included. Proposed modifications are designed to convey in excess of a 50-year storm event within streambank and reduce out-of-bank stages of larger flood events.

New channel slopes are designed 1V on 3.0H. Design channel bottom widths are 5 feet throughout the watershed above Jones Creek Road. No significant changes are proposed to existing channel bottom elevation or slope. The plan is summarized in Table 78 and illustrated on Plate 44.

Plan Effectiveness

The tentatively selected plan is designed to convey and contain a 25-year plus storm event within the streambank. Flood stages of greater storm events will also be reduced. Expected stage lowerings for various storm events at selected locations in the watershed are shown in Table 79 and Plate 57. Overflow maps, illustrating existing and with project floodplains are shown in the Engineering Appendix C. The expected reduction in floodstages will result in a substantial lowering in the number of structures located in 0-100 year floodplains (see Table 80).

By the year 2040, urbanization in the lower watershed is projected to increase from 77 to 97 percent. Estimates from hydrologic modelling indicate that both the 10-year and 100-year with project average stage will be about 0.3 feet higher.

Urbanization is projected to increase from 90 to 99 percent at Weiner Creek. This is expected to produce a rise of 0.1 and 0.2 feet, respectively, in the with project 10-year and 100-year stages. Lively Bayou's urban development is projected to increase from 70 to 94 percent. This is expected

to increase both the 10-year and 100-year with project stages by 0.2 feet. The Lively Bayou Tributary area is virtually completely urbanized and no difference in the future with project stages is expected. Implementation of a floodplain management program, that would not allow future development to significantly increase flood stages, would likely reduce these projected stage increases. The continued implementation and enforcement of East Baton Rouge Parish's floodplain ordinance (see Appendix K) will be satisfactory in this watershed.

TABLE 78

JONES CREEK - TENTATIVELY SELECTED PLAN

CHANNEL	PROPOSED BOTTOM WIDTH	LOCATION
Jones Creek	Clear & snag	Mouth to Jones Creek Road
	5'BW	Jones Creek Road to Lobdell Blvd
Weiner Creek	5'BW	Mouth to Cedar Crest Ave
Lively Bayou	5'BW	Mouth to Illinois Central RR
Lively Bayou Tributary	5'BW	Mouth to Tams Drive
Jones Creek Tributary	5'BW	Mouth to Darryl Drive

Source: U.S. Army Corps of Engineers, New Orleans District

TABLE 79
JONES CREEK - TENTATIVELY SELECTED PLAN
EXPECTED PROJECT STAGE REDUCTIONS (FT)
(WITH COMITE RIVER DIVERSION CANAL IN PLACE)

Jones Creek

Event	Jones Creek Road	S. Harrells Ferry Road	US 190	Airway Drive	Woodlake Blvd.
1-YR	4.0	6.5	4.8	6.8	4.5
2-YR	3.5	6.7	5.0	6.9	4.0
5-YR	2.9	6.8	5.6	7.1	3.6
10-YR	2.5	6.6	5.8	7.2	2.7
25-YR	2.2	6.3	6.1	7.4	2.1
50-YR	1.8	6.0	6.0	6.9	1.6
100-YR	1.9	5.7	6.0	6.6	1.3
200-YR	1.6	4.9	5.7	6.1	1.1
500-YR	1.6	4.5	5.0	5.3	1.0

Weiner Creek and Jones Creek Tributary

	Weiner Creek		Jones Creek Trib	
Event	Stanley Aubin Ln	Cedar Crest Ave	W. Tams Drive	Darryl Drive
1-YR	3.9	3.6	5.5	3.5
2-YR	4.1	3.4	5.8	4.3
5-YR	4.2	3.2	6.2	5.2
10-YR	4.2	3.1	6.8	5.9
25-YR	4.2	3.1	6.9	6.2
50-YR	4.3	2.9	6.9	6.4
100-YR	4.3	2.8	6.7	6.1
200-YR	4.4	2.7	6.4	5.8
500-YR	4.5	2.7	5.7	4.9

Lively Bayou and Tributary

	Lively Bayou		Lively Bayou Tributary		
Event	Old Hammond Highway	Plannery Road (near ILC RR)	Goodwood Blvd	Florida US 190	Tams Dr
1-YR	6.4	2.6	4.0	4.3	3.1
2-YR	6.8	3.0	4.7	4.7	3.6
5-YR	6.7	3.5	5.2	5.2	4.5
10-YR	6.4	3.8	5.5	5.6	5.2
25-YR	6.1	3.9	5.4	5.9	5.3
50-YR	5.4	3.8	5.3	5.7	5.3
100-YR	4.9	3.6	5.0	5.3	5.3
200-YR	4.2	3.3	4.5	4.9	5.2
500-YR	3.6	2.6	3.8	3.9	5.0

Source: U.S. Army Corps of Engineers, New Orleans District

TABLE 80

JONES CREEK
NUMBER OF STRUCTURES LOCATED IN THE VARIOUS FLOODPLAINS
WITH AND WITHOUT THE TENTATIVELY SELECTED PLAN
(WITH COMITE RIVER DIVERSION CANAL IN PLACE)

BASIN NO.	STRUCTURE CATEGORY	0-10 YEAR	10-25 YEAR	25-50 YEAR	50-100 YEAR	100-500 YEAR	ABOVE 500 YEAR	ALL FLOOD ZONES
JONES CREEK								
	WITHOUT PROJECT							
22	1-STORY	57	28	91	113	148	1,066	1,503
	2-STORY	7	6	19	15	38	216	301
	MOBILE HOME	1	1	0	2	0	5	9
	COMMERCIAL	50	29	51	28	36	186	380
	TOTAL	115	64	161	158	222	1,473	2,193
	WITH TENTATIVELY SELECTED PLAN							
	1-STORY	1	1	1	1	21	1,478	1,503
	2-STORY	0	0	0	0	9	292	301
	MOBILE HOME	0	0	0	1	1	7	9
	COMMERCIAL	5	0	2	0	22	351	380
	TOTAL	6	1	3	2	53	2,128	2,193
LIVELY BAYOU TRIBUTARY								
	WITHOUT PROJECT							
23	1-STORY	505	126	114	44	60	69	918
	2-STORY	20	10	4	3	5	13	55
	MOBILE HOME	0	0	0	0	0	0	0
	COMMERCIAL	2	1	0	0	0	0	3
	TOTAL	527	137	118	47	65	82	976
	WITH TENTATIVELY SELECTED PLAN							
	1-STORY	0	0	0	7	172	739	918
	2-STORY	0	0	0	1	16	38	55
	MOBILE HOME	0	0	0	0	0	0	0
	COMMERCIAL	0	0	0	0	0	3	3
	TOTAL	0	0	0	8	188	780	976

TABLE 80 (CONTINUED)

JONES CREEK
NUMBER OF STRUCTURES LOCATED IN THE VARIOUS FLOODPLAINS
WITH AND WITHOUT THE TENTATIVELY SELECTED PLAN
(WITH COMITE RIVER DIVERSION CANAL IN PLACE)

BASIN NO.	STRUCTURE CATEGORY	0-10 YEAR	10-25 YEAR	25-50 YEAR	50-100 YEAR	100-500 YEAR	ABOVE 500 YEAR	ALL FLOOD ZONES
LIVELY BAYOU								
	WITHOUT PROJECT							
24	1-STORY	116	55	64	24	78	101	438
	2-STORY	10	58	5	0	8	18	99
	MOBILE HOME	0	0	1	0	11	25	37
	COMMERCIAL	31	10	19	2	9	3	74
	TOTAL	157	123	89	26	106	147	648
	WITH TENTATIVELY SELECTED PLAN							
	1-STORY	0	0	17	2	102	317	438
	2-STORY	0	0	0	0	11	88	99
	MOBILE HOME	0	0	0	0	0	37	37
	COMMERCIAL	0	0	0	0	38	36	74
	TOTAL	0	0	17	2	151	478	648
WEINER CREEK								
	WITHOUT PROJECT							
28	1-STORY	8	0	13	0	45	229	295
	2-STORY	0	0	0	2	4	36	42
	MOBILE HOME	0	0	0	0	0	1	1
	COMMERCIAL	0	0	1	0	0	21	22
	TOTAL	8	0	14	2	49	287	360
	WITH TENTATIVELY SELECTED PLAN							
	1-STORY	0	0	0	0	0	295	295
	2-STORY	0	0	0	0	0	42	42
	MOBILE HOME	0	0	0	0	0	1	1
	COMMERCIAL	0	0	0	0	0	22	22
	TOTAL	8	0	0	0	0	360	360

SOURCE: U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT

Design and Construction

Structural improvements to this watershed consist of incorporating approximately 84,000 linear feet of reinforced concrete-lined trapezoidal channel. An improved stable section with a 5-foot bottom width and 1V on 3H side slopes will be established through excavation and backfilling. Excavated material will be disposed at the parish's Devil's Swamp landfill located about 15 miles away. The channel bottom will be paved with an 8-inch thick layer of reinforced concrete. The channel side slope paving thickness will vary. Only 4 inches of reinforced concrete will be placed in the upper two-thirds of the channel slope, with 6 inches placed in the lower one-third. Reinforced concrete cutoff walls will be located at the top-of-bank and at the bottom slope interface beneath the paving to prevent undermining of the foundation materials. A drainage system that would dissipate any excess hydrostatic pressure will be required. The system will consist of weep holes, filter fabric, and filter sand placed beneath both the 6-inch side slope and 8-inch bottom paving. A reinforced concrete-lined drainage ditch will be constructed on each side of the finished top of bank to intercept excess runoff. Also included, as required by local ordinance, is a chain link fence along both sides of the paved reaches. This fence will likely be placed at the public right-of-way line. See Plate 48. Additionally, 3 miles of channel clearing and snagging is proposed from Jones Creek Road to the Amite River. Further details can be found in the Engineering Appendix C.

The proposed work will be performed immediately adjacent to developed residential properties. Narrow rights-of-way and limited access points will affect construction. Much of the work access will be from inside the channel itself. Temporary fuseplug dams will also be required to dewater sections to facilitate the placement of concrete. Overall, project constructability appears to be fairly difficult.

It was determined that it would be practical to separate construction of this watershed's project into four segments: Lower Jones Creek, Upper Jones Creek and Tributary, Lively Bayou and Tributary, and Weiner Creek. Construction would be phased, first with Lower Jones Creek followed by the remaining

three sections. The total construction duration for the entire Jones Creek watershed project is estimated at six years.

Relocations and Removals

There are no roadway or utility relocations proposed for the Jones Creek project. The channel paving final design will accommodate existing facilities.

Real Estate

The tentatively selected plan will require the purchase of less than one acre for channel construction. No structures or improvements will be taken for this portion of the project. No land purchase is required for disposal since the parish landfill will be used. Construction access will be obtained from publicly-owned bridge crossing rights-of-way. Some additional access may be required in some locations and additional construction easements may be required. Mitigation needs will require the purchase of 99 acres of cleared land for reforestation. Land purchase for channel modifications and the proposed bike path (see below) will be fee title, excluding mineral rights. Mitigation purchases will be the same. To facilitate the proposed bike path (see below), 13 acres of existing perpetual servitude must be converted to fee title.

Mitigation

The mitigation feature of the tentatively selected plan consists of reforestation of 99 acres of existing cleared land. It was determined to be practicable to combine mitigation sites for the tentatively selected plan for all watersheds. Two sites will be utilized for mitigation. See Plates 52 and 53. The required 99 acres for this watershed's tentatively selected plan will be included as a portion of the entire habitat mitigation package for all five watersheds.

Recreation

A bike path is proposed as part of the project in this watershed. See Environmental Appendix E. The total length of the proposed bike path is about 11 miles alongside the channels, plus, 3 miles of connecting streets. The proposed

path will utilize the top of bank drainage structure on one side of the channel. See Plate 48. Where the path is located, the proposed chain link fence is required as part of the channel design, will be placed between the bike path and the channel slope for safety. A wooden fence will be installed outside the bike path, along the right-of-way line. This fence is necessary to provide security and privacy to residents living along the proposed bike path which will be open to public access. Additionally, some aesthetic tree and shrub plantings are proposed along the path. Two bridge structures are also proposed in order to connect the path across the stream. All bike path items necessary for the connecting streets (signage and street marking) will be provided solely by the parish and are not included in the Federal cost sharing of this project.

Aesthetics

For aesthetic purposes, a top-of-bank tree replanting plan is proposed and consists of 4.25 miles of tree and shrub line planting along both sides of Jones Creek for a total of 8.5 miles. These plantings occur in areas of impact relative to channel improvement involving clearing of top-of-bank vegetation. Replacing trees and shrubs lost during construction will return aesthetic conditions to the pre-project condition. See Table 3 of the Environmental Appendix which identifies tree and shrub requirements and cost per watershed.

Cultural Resources

Three recorded sites have received previous impacts. One of which has been evaluated as part of this project. Preliminary investigations, which have been coordinated with the State Historic Preservation Officer, indicate that no significant cultural resources will likely be impacted by the tentatively selected plan. The project area is considered to have a very low probability for containing any sites. Final preconstruction surveys may, however, be conducted. Such efforts will be coordinated with the State Historic Preservation Officer.

Stream Gaging

The U.S. Geological Survey has an existing parish-wide stream gaging program that includes installations in this watershed. Improvements are proposed for five gages at the following locations: Jones Creek at Woodland Ridge Drive, Woodlake Drive and Goodwood Boulevard, Weiner Creek at Sherwood Forest Boulevard, and Lively Bayou at Old Hammond Highway. Data from these gages will be used in both the final project design and in monitoring the effectiveness of the project. Gages will be upgraded as part of this project's construction and then will be maintained by the U.S. Geological Survey as part of their existing parish program.

Operation and Maintenance, Repair, Replacement, and Rehab (O&M)

Required O&M for the channels consist of continuous inspection and debris removal, annual herbicide application, and pavement repair when necessary. Maintenance of combined project mitigation areas is also necessary and such costs have been prorated to the overall O&M of this watershed's tentatively selected plan.

Herbicide spraying would be conducted in accordance with the Environmental Protection Agency's guidelines.

Environmental and Social Effects

The only significant long term environmental impact of the tentatively selected plan is the destruction of 78 acres of bottomland hardwood forestation. This loss will be mitigated with the planting and maintenance of 99 acres of existing cleared land. There will be short term turbidity effects on stream water quality during construction. Aquatic habitat will receive adverse impacts from reduced divesity and increased in-stream temperatures. The loss of screening vegetation along the channel banks would result in a significant aesthetic loss. However, this loss would be mitigated by the planting with both trees and shrubs on both sides of 4.25 miles of channel.

The most significant beneficial social impact of this plan would be the relief from flooding to those affected. Also,

major property erosion problems would be mitigated by this plan (see discussion below).

Economic Benefits

The tentatively selected plan would generate significant economic benefits from flood damage reduction to existing, and, to some extent, projected future development. Benefits were only quantified, however, for existing development. It is estimated that annual average damages in this watershed would be reduced by about 95 percent. A breakdown of these anticipated benefits are shown in Table 75.

In addition to the above direct and indirect flood damage reduction benefits, the proposed paving of channels in this watershed will have a significant beneficial impact on existing property erosion problems. As stated above, streambank erosion is widespread in this watershed. In some reaches, the problem is severe where large sections of private property are sloughing down into the channel banks. There are several instances where private structures, such as garages, patios, and driveways, have been damaged. See photos, Figure 1. There are numerous areas where the continuation of this process will certainly damage private structures and severely devalue these properties. There are several major litigations filed by private owners against East Baton Rouge Parish claiming damage relief from this problem. Short-term efforts to mitigate the erosion problem have been ineffective (see photos).

Several factors were considered in developing a methodology to quantify the benefits associated with abating the erosion problem. A conservative approach was developed that consisted of estimating the erosion rate of each stream reach and combining it with the average land square foot real estate value of the area. See Engineering and Economic Appendix. While the actual soils directly eroded are within the existing channel right-of-way and have little value, there is almost an immediate "translation" of the soils loss as the top of bank section, well beyond the public right-of-way, creeps and/or sloughs down the stream embankment.

Applying estimated erosion rates in conjunction with estimated property land values, equivalent annual damages were

calculated. The proposed paving of the channels will abate these damages and this value was therefore included as an economic benefit produced by this project.

Final Costs, Net Benefits

Final costs and benefits for the tentatively selected plan by feature are shown in Table 81. Complete itemized costs by account code feature breakdown are shown in Table 82. The total first cost of the tentatively selected plan, including all items, is estimated to be $52,590,000. Total tentatively selected plan annual operation and maintenance costs, including all features, is estimated at $67,000 per year. Project first costs were converted to equivalent annual dollars using an interest rate of 8.00 percent over a 50-year project life. It has been determined that the estimated equivalent annual costs and benefits will generate $4,565,000 per year net benefits. The benefit-cost ratio is 1.86 to 1. Removing the recreation feature from the plan results in the following adjustments: first cost $51,275,000, annual O&M $33,000, net annual benefits $3,988,000, and B/C ratio of 1.75 to 1.

Construction of each watershed's tentatively selected plan will be phased. Construction of the tentatively selected plan for Jones Creek is scheduled to start in 1999. Fully-funded cost estimates in accordance with this construction schedule are shown in Plan Implementation.

Cost-Sharing

A breakdown of incremental and fully-funded cost-sharing requirements for the tentatively selected plan is shown in Plan Implementation. The local sponsor will be responsible in providing and/or bearing the full costs of all required lands, easements, rights-of-way, relocations, and disposal areas for this project. The local sponsor will also bear 100 percent of annual operation and maintenance, and, all replacement costs.

TABLE 81
JONES CREEK
PROJECT COSTS AND BENEFITS FOR THE TENTATIVELY SELECTED PLAN
(1994 DOLLARS, 8.00% INTEREST, 50-YEAR PERIOD)

FIRST COSTS	
CONSTRUCTION FEATURE	$52,590,000
GROSS INVESTMENT (includes interest lost during construction)	$64,433,880
AVERAGE ANNUAL COSTS	
INTEREST/AMORTIZATION	$ 5,267,000
OPERATION/MAINTENANCE	$ 67,000
TOTAL AVERAGE ANNUAL COSTS	$ 5,334,000
AVERAGE ANNUAL BENEFITS*	
INUNDATION REDUCTION	$ 7,931,400
FIA COSTS SAVED	$ 102,140
REDUCED EMERGENCY COSTS	$ 140,600
FILL REDUCTION	$ 96,050
RECREATION	$ 577,000
EROSION CONTROL	$ 362,700
BENEFITS DURING CONSTRUCTION	$ 689,000
TOTAL AVERAGE ANNUAL BENEFITS	$ 9,898,890
BENEFIT/COST RATIO	1.86

* CALCULATED WITH PROPOSED COMITE RIVER DIVERSION CANAL IN PLACE

SOURCE: U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT

TABLE 82
JONES CREEK - TENTATIVELY SELECTED PLAN
CHART OF ACCOUNTS

Account Code	Item	Quantity	Unit	Unit Price	Amount	Contingencies	Project Cost
01---	LANDS AND DAMAGES						
	Construction						
01B--	Acquisitions						
01B1-	By Government				18,460	4,710	23,170
01B2-	By Local Sponsor(LS)				19,800	5,050	24,850
01B4-	Review Of LS				5,270	1,340	6,610
						0	
01E--	Appraisals					0	
01E3-	By LS				1,000	250	1,250
01E5-	Review of LS				800	200	1,000
						0	
01G--	Temporary Permits					0	
01G1-	By Government				9,230	2,340	11,570
01G2-	By LS				13,840	3,530	17,370
01G5-	Other				2,640	670	3,310
						0	
01R--	Real Estate Payments					0	
01R1-	Land Payments					0	
01R1B	By LS				1,000	1,000	2,000
						0	
01T--	LERRD Credits					0	
01T1-	Land Payments				11,120	2,820	13,940
01T2-	Administrative Costs				13,290	3,380	16,670
01T4-	Other				3,400	860	4,260
01---	Subtotal: Lands And Damages (Construction)						99,850
	Contingencies						26,150
01---	Subtotal: Lands And Damages (Construction)						126,000
	Mitigation						
01B1-	By Government				1,090	270	1,360
01B2-	By Local Sponsor(LS)				1,710	440	2,150
01B4-	Review Of LS				320	80	400
01C--	Condemnations						
01C2	By LS				340	90	430
01C4-	Review of LS				150	40	190
01E--	Appraisals						
01E3-	By LS				1,700	430	2,130
01E5-	Review of LS				430	110	540
01F--	PL 91-646 Assistance						
01F1-	By Government				150	40	190
01F4-	Review Of LS				50	10	60
01G--	Temporary Permits						
01G1-	By Government				480	120	600
01G2-	By LS				680	170	850
01G4-	Review of LS				140	40	180
01R--	Real Estate Payments						
01R1-	Land Payments						
01R1B	By LS				283,250	71,320	354,570
01T--	LERRD Credits						
01T1-	Land Payments				770	190	960
01T3-	PL 91-646 Assistance				760	190	950
01T2-	Administrative Costs				960	240	1,200
01T4-	Other				190	50	240

Account Code	Item	Quantity	Unit	Unit Price	Amount	Contingencies	Project Cost
01---	Subtotal: Lands And Damages (Mitigation)						293,170
	Contingencies						73,830
01---	Subtotal: Lands And Damages (Mitigation)						367,000
01---	TOTAL: LANDS AND DAMAGES						493,000
06------	FISH AND WILDLIFE FACILITIES						
0603----	Wildlife Facilities And Sanctuaries						
060301--	Mob And Demob						
060371--	Fences						
06037102	Fencing	6,432	LF	5.45	35,054	9,016	44,070
060373--	Habitat And Feeding Facilities						
06037302	Planting	111	AC	150.00	16,650	4,280	20,930
06------	Subtotal: Fish And Wildlife Facilities						51,704
	Contingencies						13,296
06------	TOTAL: FISH AND WILDLIFE FACILITIES						65,000
09------	CHANNELS AND CANALS						
0901----	Channels						
090101--	Mob & Demob	Lump Sum	LS	470,000.00	470,000	117,500	587,500
09011502	Clearing For Channel Dredging	272	AC	3,100.00	843,200	210,800	1,054,000
09011502	Degrading, Hauling, Shaping (16 Miles)	162,000	CY	10.00	1,620,000	810,000	2,430,000
09011502	Clearing and Snagging	3	MI	19,000.00	57,000	14,250	71,250
09013002	Sand (8" Thick)	84,000	CY	11.60	974,400	243,600	1,218,000
09013002	Filter Drain Fabric	418,700	SY	7.50	3,140,250	785,062	3,925,312
09013002	Fuseplug Dams	Lump Sum	LS	108,000.00	108,000	27,000	135,000
09013003	Concrete Lining						
	Cutoff Wall	6,150	CY	150.00	922,500	230,625	1,153,125
	Channel Slope Pavement (4")	82,300	CY	130.00	10,699,000	2,670,000	13,369,000
	Channel Slope Pavement (6")	61,300	CY	150.00	9,195,000	2,300,000	11,495,000
	Channel Slab Pavement (8")	11,000	CY	150.00	1,650,000	412,500	2,062,500
	Drain Ditch	33,100	CY	130.00	4,303,000	1,080,000	5,383,000
09019905	Fencing (chain link)	171,000	LF	8.25	1,410,750	352,563	1,763,313
09019906	Aesthetic Planting						
	Aesthetic Tree Planting	1,800	EA	15.00	27,000	6,500	33,500
	Aesthetic Shrub Planting	3,000	EA	11.00	33,000	8,500	41,500
09------	SUBTOTAL: Channels And Canals						35,453,100
	Contingencies						9,268,900
09------	TOTAL: CHANNELS AND CANALS						44,722,000
14------	RECREATION FACILITIES						
14002202	Bridge - 10' X 50'	Lump Sum	LS	23,500.00	23,500	5,500	29,000
14002202	Bridge - 10' X 150'	Lump Sum	LS	106,000.00	106,000	26,500	132,500
14002202	Signs & Markers	20	EA	160.00	3,200	800	4,000
14002202	Trees	4,431	EA	15.00	66,465	16,600	83,065
14002202	Fence (6' Wooden)	55,440.0	LF	12.80	709,632	177,803	887,435
14------	SUBTOTAL: Recreation Facilities						908,797
	Contingencies						227,203
14------	TOTAL: RECREATION FACILITIES						1,136,000

Account Code	Item	Quantity	Unit	Unit Price	Amount	Contingencies	Project Cost
29---	PROJECT COOPERATION AGREEMENTS						
29A--	Draft PCA						
29A9-	All Other				600	100	700
29B--	Final PCA and Financial Plan						
29B9-	All Other				600	100	700
29C--	PCA Negotiations						
29C9-	All Other				500	100	600
29---	Subtotal: Project Cooperation Agreements						1,700
	Contingecies						300
29---	TOTAL: PROJECT COOPERATION AGREEMENTS						2,000
30---	ENGINEERING AND DESIGN						
30C--	Design Memorandum				878,000	176,000	1,054,000
30CD-	HTRW Studies				125,000	12,000	137,000
30CF-	Cost Estimates				21,000	4,000	25,000
30CN-	VE Studies				30,000	6,000	36,000
30DA-	P&S #1 -				200,000	40,000	240,000
30DF-	Cost Estimates				14,000	3,000	17,000
30DN-	VE Studies				5,000	1,000	6,000
30DA-	P&S #2 -				205,000	41,000	246,000
30DF-	Cost Estimates				14,000	3,000	17,000
30DN-	VE Studies				5,000	1,000	6,000
30DA-	P&S #3 -				162,000	32,000	194,000
30DF-	Cost Estimates				12,000	2,000	14,000
30DN-	VE Studies				5,000	1,000	6,000
30DA-	P&S #4 -				110,000	22,000	132,000
30DF-	Cost Estimates				10,000	2,000	12,000
30DN-	VE Studies				5,000	1,000	6,000
30DA-	P&S - Mitigation				20,000	4,000	24,000
30DS-	Construction Contract Award Activities				40,000	8,000	48,000
30DV-	Engineering During Construction				115,000	23,000	138,000
30E--	Engineering And Design Phase Project Management				144,000	29,000	173,000
30Z--	Misc. Activities						
	Monitoring						
	Install Gages				35,000	7,000	42,000
	Preconstruction O&M For Gages				158,000	32,000	190,000
	PMO				179,000	36,000	215,000
	LMVD				12,000	2,000	14,000
30---	SUBTOTAL: Engineering And Design						2,504,000
	Contingencies						488,000
30---	TOTAL: ENGINEERING AND DESIGN						2,992,000
31---	CONSTRUCTION MANAGEMENT						
31B--	Contract Administration						
31B3-	Review And Approval of Contract Payments				94,000	19,000	113,000
31B4-	Contract Modifications				279,000	56,000	335,000
31B5-	Progress And Completion Reports				115,000	23,000	138,000
31B9-	All Other				398,000	80,000	478,000

Account Code	Item	Quantity	Unit	Unit Price	Amount	Contingencies	Project Cost
31D--	Review of Shop Drawings						
31D0-	Review of Shop Drawings				75,000	15,000	90,000
31E--	Inspection & Qual. Assur.						
31E1-	Schedule Compliance				73,000	15,000	88,000
31E2-	Compliance Sampling And Testing				79,000	16,000	95,000
31E3-	Quality Surveys				180,000	36,000	216,000
31E4-	Title II Services				151,000	30,000	181,000
31E9-	All Other				1,063,000	213,000	1,276,000
31T--	Construction Phase Project Management				142,000	28,000	170,000
31---	SUBTOTAL: Construction Management						2,649,000
	Contingencies						531,000
31---	TOTAL: CONSTRUCTION MANAGEMENT						3,180,000
	TOTAL: JONES CREEK						52,590,000

Risk and Uncertainty

A modified risk and uncertainty analysis was performed on calculated benefits and costs of the tentatively selected plan. In general, statistical ranges used in this analysis were broad and were established primarily for the purposes of identifying the direction of change that may be expected due to known uncertainties. The single value estimates calculated above were, therefore, used as the basis for determining the ultimate cost-effectiveness of the plan.

Six items were identified as having potential major variance on the overall project's feasibility. These items and their estimated variance ranges are discussed below. Additional detail of the analysis can be found in the Economics Appendix H.

- Stage Frequency Values.

  Without project (existing) and with project floodstage frequency values directly affect existing and with project calculated damage dollar values. Variances on stages were determined to be practicably within plus or minus 1.0 feet for all storm frequency events for without project conditions, and, plus or minus 0.5 feet for with project conditions. See Engineering Appendix C. Damage values were recalculated incorporating this range. Applying the results, it is estimated that without project flood damages vary from minus $4,721,000 to plus $10,231,000 per year from the single value estimate. With project flood damages are estimated to vary from minus $42,000 to plus $45,000 per year from the single value estimate. Note that it was determined that there is likely to be some correlation between existing and with project stage frequency variance. A correlation factor of 0.5 was applied to this item in the "risk analysis" calculations described below.

- Structure Elevations.

  Variances in structure elevations directly affect both existing and with project calculated damage

dollar values. Within practical limits, structure elevation variance was determined to be minus 0.5 to plus 0.5 feet. The calculated dollar value variance is minus $3,772,000 to plus $1,901,000 for existing annual damages, and, minus $42,000 to plus $45,000 for with project annual damages. Note that there is a direct correlation between existing and with project variances. A correlation factor of 1.0 was therefore applied to this item in the "risk analysis" calculations described below.

- Structure Valuations.

Variances in the estimate of structure values also affect both existing and with project calculated damage dollar value. Structure value variance range is estimated at plus or minus 10 percent from the single vaule estimate. Damage values were recalculated incorporating this range. Applying these results, it is estimated that existing flood damages vary from minus $758,000 to plus $784,000 per year. With project flood damages range from minus $9,000 to plus $9,000. A correlation factor of 1.0 is applicable to this set of values.

- Construction Costs.

Estimated variances in calculated quantities, unit prices, constructability, and other factors were considered in calculating the channel construction cost estimate. The calculated cost range is from minus $20,805,000 to plus $2,660,000 relative to the single value estimate used for this item. Converting this range to equivalent annual dollars yields minus $2,080,000 to plus $266,000 per year.

- Erosion Abatement Benefits.

The estimated annual benefits calculated for erosion abatement are quite speculative. A plus or minus range of 50 percent should be considered for this item. This adjustment range is minus $196,000 to plus $196,000 per year.

- Property Utility Values

  In addition to the loss of "land" property, the strong probability exists that significant or entire property utility values will be lost over time if the channels in this watershed are not paved. That is to say, for example, that an existing home purchased at $85,000 may not be able to be sold at any price if the backyard has sloughed into the channel. Furthermore, it is quite likely that unabated erosion will result in direct damage to structures, given time. Through field investigation, it is estimated that up to 50 properties could lose their utility values within five years given present conditions. These properties consist of residential and a small number of small commercial sites. It is therefore estimated that a potential loss of $33,000 per each property ($3.25 million) could possibly occur in five years. Discounting over the five year period and conversion to annual dollars yields $111,000 per year. Since this item was not considered in the most likely estimate of benefits for this plan, a range of minus $0 to plus $111,000 per year was considered for this additional item.

The above uncertainty spreads were integrated with the single most likely value estimates for existing annual damages, with project damages and project costs. With the aid of "At Risk" computer software, probability ranges were calculated. See Risk Analysis calculations in Economic Appendix H. The calculated probability distributions for project cost, benefits, net benefits, and benefit-to-cost ratio are illustrated in Figures 10 through 13.

The calculated expected values generated as compared to the single value estimates were determined as follows:

(EQUIVALENT ANNUAL)	SINGLE VALUE ESTIMATE	CALCULATED EXPECTED VALUE
PROJECT BENEFITS	\$9,899,000	\$11,160,000
PROJECT COSTS	\$5,334,000	\$ 4,729,000
NET BENEFITS	\$4,565,000	\$ 6,431,000
BENEFIT/COST RATIO	1.86	2.39
PROBABILITY OF PROJECT NET POSITIVE BENEFITS	N/A	99%

These results show an expected increase in project net benefits. This increase was due primarily to the sensitivity of calculated existing damages given a flood stage frequency variance of plus or minus 1.0 feet.

Figure 10
Jones Creek
Probability Distribution

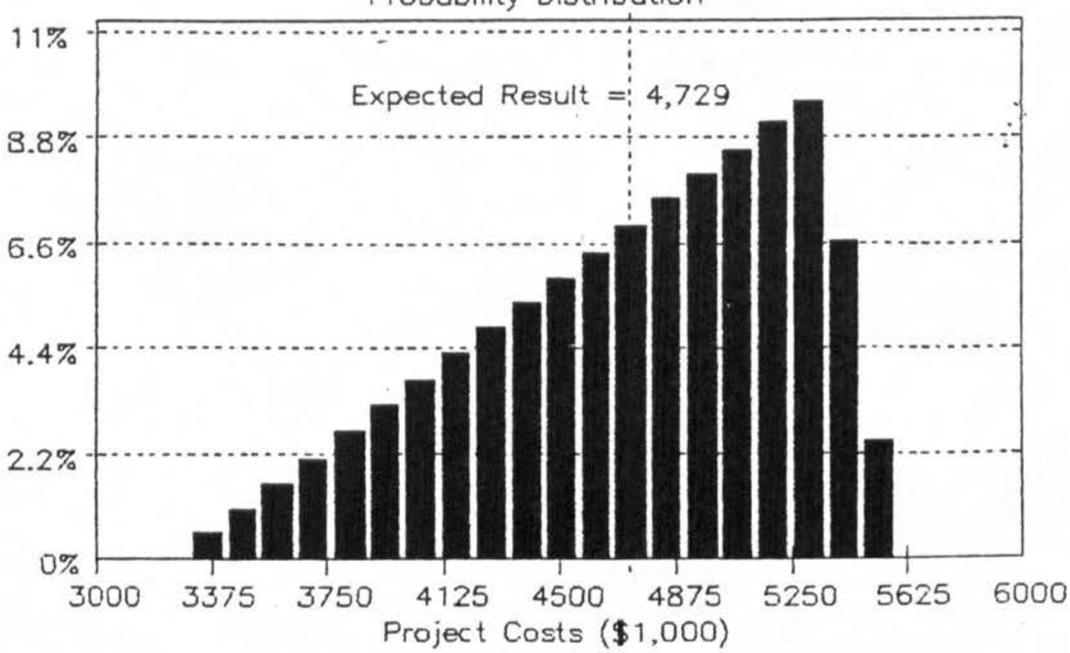


Figure 11
Jones Creek
Probability Distribution

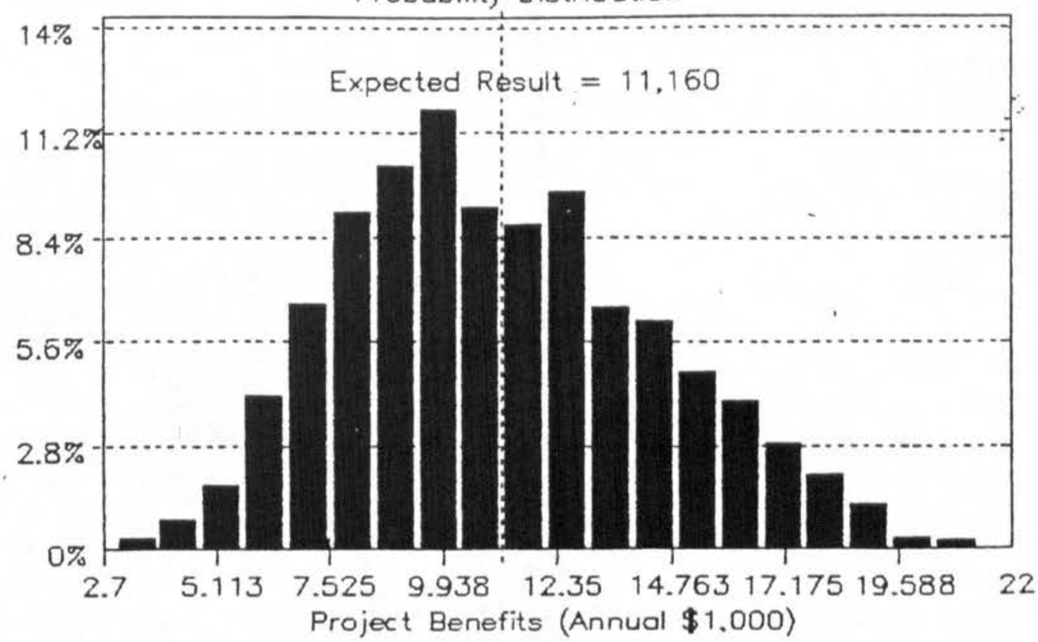


Figure 12
Jones Creek
Probability Distribution

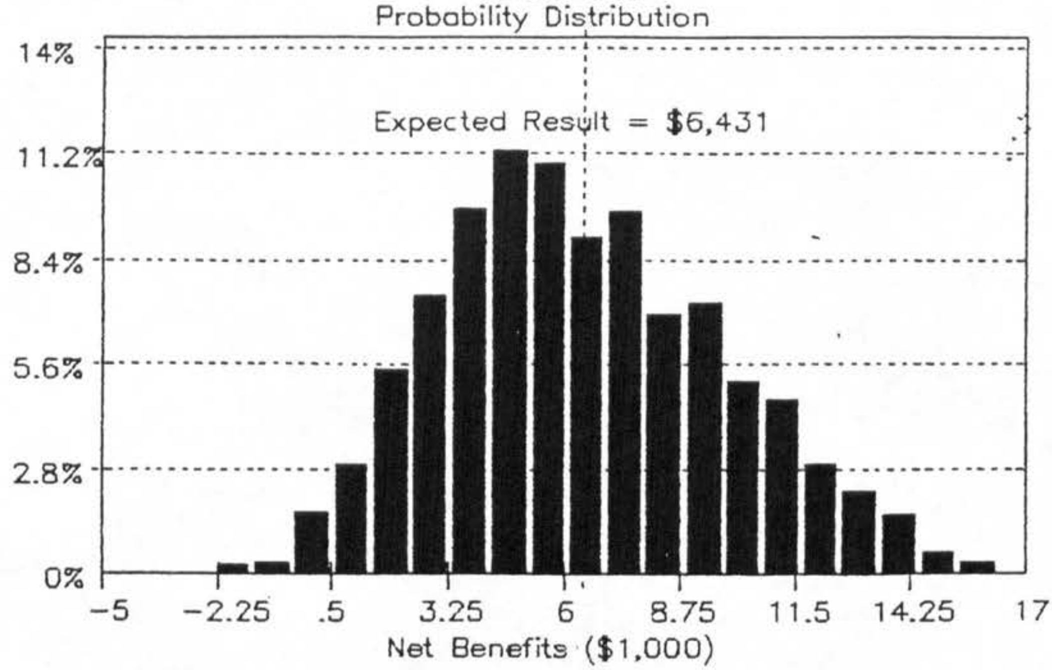
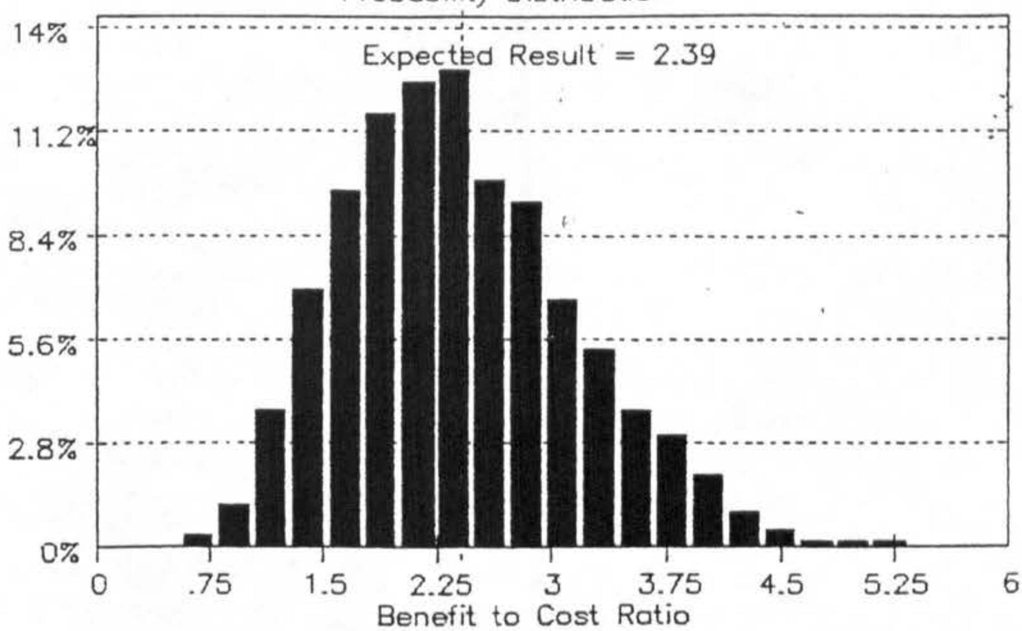


Figure 13
Jones Creek
Probability Distribution



WARD CREEK

Description

The proposed plan for Ward Creek consists of clearing and/or concrete lining approximately 14 miles of channel. Minimal clearing and snagging of the main stem of Ward Creek is proposed from its mouth upstream to Corporate Boulevard, not including the newly enlarged and relocated section between Pecue and Siegen Lanes. Also included are proposed improvements to the bayou's two main tributaries. Proposed minimal clearing and snagging of Dawson Creek begins from its mouth upstream to its confluence with Bayou Duplantier just above Kenilworth Boulevard. Concrete lining of North Branch of Ward Creek is proposed from immediately downstream of I-10 to immediately downstream of I-12 with a design channel section consisting of a 32-foot bottom and 3:1 side slopes. An existing paved section in this reach of approximately 1,250 feet with an established side slope of 2:1 shall remain which the proposed concrete section will be tied into with the 3:1 side slope. Plan details are listed in Table 83. This plan is shown on Plate 45.

TABLE 83

WARD CREEK - TENTATIVELY SELECTED PLAN

Stream	Reach	Type of Improvement
	Earthen and Concrete Improvements	
Ward Creek	Mouth to 4000 ft upstream	No Work
	4000 ft upstream to 1200 ft u/s Pecue Lane	Minimal Clearing and Snagging
	1200 ft u/s Pecue Lane to Seigen Lane	No Work: 150′ BW by Developer made,
	Siegen Ln to Corporate Blvd	Minimal Clearing and Snagging
North Branch Ward Creek	Mouth to I-12	Concrete-Line: 32′ BW, 1V on 3H SS
	I-12 to Florida Blvd	No Work
Dawson Creek	Mouth to Bayou Duplantier	Minimal Clearing and Snagging
	Bayou Duplantier to Hundred Oaks Dr	No Work
Bayou Duplantier	Mouth to Darymple Dr	No Work

Source: U.S. Army Corps of Engineers, New Orleans District

Plan Effectiveness

Expected stage lowering for various storm events at selected locations in the watershed are shown in Table 84 and Plate 57. Overflow maps, illustrating existing and with project floodplains are shown in the Engineering Appendix C. The expected reduction in floodstages will result in a substantial lowering in the number of structures located in the 0-10 year floodplain basinwide. In the North Branch Tributary area, it is expected that the project will substantially reduce the number of structures in the 0-50 year floodplain. See Table 85.

Table 86 illustrates the effects of projected urbanization on the Ward Creek watershed with the Tentatively Selected Plan in place. Moderate stage increases are expected on the main

stem of Ward Creek. Implementation of a floodplain management program, that would not allow future development to significantly increase flood stages, would likely reduce these projected stage increases. The continued implementation and enforcement of East Baton Rouge Parish's current floodplain ordinance (see Appendix K) will be satisfactory in this watershed.

TABLE 84
WARD CREEK - TENTATIVELY SELECTED PLAN
EXPECTED PROJECT STAGE REDUCTIONS (FT)
(WITH COMITE RIVER DIVERSION CANAL IN PLACE)

Ward Creek

Event	Barringer Foreman Rd	Siegen Lane	N. Branch Ward Creek	Corporate Blvd.	Government Street
1-YR	0.0	0.0	0.6	0.9	0.0
2-YR	0.0	0.0	0.6	0.8	0.0
5-YR	0.0	0.0	0.6	0.7	0.0
10-YR	0.0	0.0	0.6	0.6	0.0
25-YR	0.0	0.0	0.4	0.5	0.0
50-YR	0.0	0.0	0.4	0.5	0.0
100-YR	0.0	0.0	0.3	0.4	0.0
200-YR	0.0	0.0	0.2	0.4	0.0
500-YR	0.0	0.0	0.2	0.3	0.0

North Branch Ward Creek

Event	Mouth	I-12	Old Hammond Highway	Florida Blvd
1-YR	0.6	5.8	5.6	0.0
2-YR	0.6	5.4	6.0	0.0
5-YR	0.6	4.9	6.5	0.0
10-YR	0.6	4.7	6.9	0.0
25-YR	0.4	4.6	7.3	0.0
50-YR	0.4	4.5	7.5	0.0
100-YR	0.3	4.5	7.3	0.0
200-YR	0.2	4.4	7.1	0.0
500-YR	0.2	4.2	6.6	0.0

Dawson Creek

Event	Mouth	Bluebonnet Street	Moss Side Lane
1-YR	0.5	0.2	0.2
2-YR	0.5	0.2	0.2
5-YR	0.4	0.2	0.1
10-YR	0.3	0.2	0.1
25-YR	0.3	0.2	0.0
50-YR	0.3	0.2	0.0
100-YR	0.2	0.2	0.0
200-YR	0.2	0.2	0.0
500-YR	0.2	0.2	0.0

TABLE 84 (CONTINUED)
WARD CREEK - TENTATIVELY SELECTED PLAN
EXPECTED PROJECT STAGE REDUCTIONS (FT)
(WITH COMITE RIVER DIVERSION CANAL IN PLACE)

Bayou Duplantier

Event	Mouth	College (Lee) Drive	Stanford Avenue
1-YR	0.4	0.4	0.4
2-YR	0.4	0.4	0.4
5-YR	0.4	0.4	0.4
10-YR	0.3	0.3	0.3
25-YR	0.3	0.3	0.3
50-YR	0.3	0.3	0.3
100-YR	0.2	0.2	0.2
200-YR	0.2	0.2	0.2
500-YR	0.2	0.2	0.2

Source: U.S. Army Corps of Engineers, New Orleans District

Design and Construction

Minimal clearing and snagging work will be performed within the low top of bank contour. It is anticipated that the work will be accomplished using chain saws and transloaders. Approximately 300,000 cubic yards of excavation spoil will be disposed of by truck hauling to borrow pits on the Mississippi River batture about 6 miles, on average, from the watershed. See Plate 50. This disposal location is located closer to the project area versus the parish landfill and, therefore, was changed from the initial plan to reduce construction cost. Non-vegetative "trash" removed from the channels will, however, be hauled to Devil's Swamp. Structural improvements to this watershed consist of incorporating approximately 5600 linear feet of reinforced concrete-lined trapezoidal channel. An improved stable section with a 32-foot bottom width and 1V on 3H side slopes will be established through excavating and backfilling.

TABLE 85

WARD CREEK
NUMBER OF STRUCTURES LOCATED IN THE VARIOUS FLOODPLAINS
WITH AND WITHOUT THE TENTATIVELY SELECTED PLAN
(WITH COMITE RIVER DIVERSION CANAL IN PLACE)

BASIN NO.	STRUCTURE CATEGORY	0-10 YEAR	10-25 YEAR	25-50 YEAR	50-100 YEAR	100-500 YEAR	ABOVE 500 YEAR	ALL FLOOD ZONES
WARD CREEK								
	WITHOUT PROJECT							
21	1-STORY	14	59	56	182	456	1,275	2,042
	2-STORY	1	0	5	2	3	25	36
	MOBILE HOME	0	0	0	0	1	0	1
	COMMERCIAL	3	13	17	48	91	220	392
	TOTAL	18	72	78	232	551	1,520	2,471
	WITH TENTATIVELY SELECTED PLAN							
	1-STORY	1	16	61	205	481	1,278	2,042
	2-STORY	1	0	2	5	3	25	36
	MOBILE HOME	0	0	0	0	1	0	1
	COMMERCIAL	2	5	18	34	116	217	392
	TOTAL	4	21	81	244	601	1,520	2,471
BAYOU DUPLANTIER								
	WITHOUT PROJECT							
25	1-STORY	3	13	1	22	9	65	113
	2-STORY	2	6	6	6	6	15	41
	MOBILE HOME	0	0	0	0	0	0	0
	COMMERCIAL	12	2	2	4	13	13	46
	TOTAL	17	21	9	32	28	93	200
	WITH TENTATIVELY SELECTED PLAN							
	1-STORY	2	14	1	13	18	65	113
	2-STORY	1	6	7	2	10	15	41
	MOBILE HOME	0	0	0	0	0	0	0
	COMMERCIAL	12	2	2	2	14	14	46
	TOTAL	15	22	10	17	42	94	200

TABLE 85 (CONTINUED)

WARD CREEK
NUMBER OF STRUCTURES LOCATED IN THE VARIOUS FLOODPLAINS
WITH AND WITHOUT THE TENTATIVELY SELECTED PLAN
(WITH COMITE RIVER DIVERSION CANAL IN PLACE)

BASIN NO.	STRUCTURE CATEGORY	0-10 YEAR	10-25 YEAR	25-50 YEAR	50-100 YEAR	100-500 YEAR	ABOVE 500 YEAR	ALL FLOOD ZONES
DAWSON CREEK								
	WITHOUT PROJECT							
26	1-STORY	51	50	20	14	24	72	231
	2-STORY	10	5	3	1	1	9	29
	MOBILE HOME	0	0	0	0	0	0	0
	COMMERCIAL	52	50	11	17	15	64	209
	TOTAL	113	105	34	32	40	145	469
	WITH TENTATIVELY SELECTED PLAN							
	1-STORY	51	50	20	14	24	72	231
	2-STORY	10	5	3	1	1	9	29
	MOBILE HOME	0	0	0	0	0	0	0
	COMMERCIAL	52	50	11	17	15	64	209
	TOTAL	113	105	34	32	40	145	469
NORTH BRANCH - WARD CREEK								
	WITHOUT PROJECT							
27	1-STORY	17	84	41	161	167	366	836
	2-STORY	3	18	1	21	61	45	149
	MOBILE HOME	0	0	0	0	0	0	0
	COMMERCIAL	23	16	14	9	19	233	314
	TOTAL	43	118	56	191	247	644	1,299
	WITH TENTATIVELY SELECTED PLAN							
	1-STORY	2	20	10	4	36	764	836
	2-STORY	1	10	1	10	9	118	149
	MOBILE HOME	0	0	0	0	0	0	0
	COMMERCIAL	18	6	14	3	11	262	314
	TOTAL	21	36	25	17	56	1,144	1,299

TABLE 85 (CONTINUED)

WARD CREEK
NUMBER OF STRUCTURES LOCATED IN THE VARIOUS FLOODPLAINS
WITH AND WITHOUT THE TENTATIVELY SELECTED PLAN
(WITH COMITE RIVER DIVERSION CANAL IN PLACE)

BASIN NO.	STRUCTURE CATEGORY	0-10 YEAR	10-25 YEAR	25-50 YEAR	50-100 YEAR	100-500 YEAR	ABOVE 500 YEAR	ALL FLOOD ZONES
DAWSON CREEK								
	WITHOUT PROJECT							
30	1-STORY	20	69	17	8	119	54	287
	2-STORY	0	2	2	10	18	19	51
	MOBILE HOME	0	0	0	0	0	0	0
	COMMERCIAL	19	20	3	5	12	82	141
	TOTAL	39	91	22	23	149	155	479
	WITH TENTATIVELY SELECTED PLAN							
	1-STORY	20	69	3	21	108	66	287
	2-STORY	0	2	0	9	20	20	51
	MOBILE HOME	0	0	0	0	0	0	0
	COMMERCIAL	17	22	2	5	13	82	141
	TOTAL	37	93	5	35	141	168	479
WARD CREEK								
	WITHOUT PROJECT							
32	1-STORY	17	5	49	29	82	155	337
	2-STORY	3	2	3	2	2	15	27
	MOBILE HOME	4	0	0	0	1	71	76
	COMMERCIAL	23	6	19	15	2	13	78
	TOTAL	47	13	71	46	87	254	518
	WITH TENTATIVELY SELECTED PLAN							
	1-STORY	17	5	49	29	82	155	337
	2-STORY	3	2	3	2	2	15	27
	MOBILE HOME	4	0	0	0	1	71	76
	COMMERCIAL	23	6	19	3	14	13	78
	TOTAL	47	13	71	34	99	254	518

SOURCE: U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTICR

TABLE 86

STAGE FREQUENCY EFFECTS OF PROJECTED URBANIZATION
FOR THE TENTATIVELY SELECTED PLAN FOR WARD CREEK

Reach	Existing (1985) Percent Urbanization	Projected (2040) Percent Urbanization	Projected Increase in Stage (Ft.)	
			10-yr	100-yr
Ward Creek (Lower)	40	100	0.6	0.3
Upper Ward Creek	75	98	0.4	0.3
North Br. Ward Creek	97	100	0.1	0.1
Dawson Creek (Lower)	72	96	0.3	0.3
Upper Dawson Creek	92	96	0.1	0.1
Bayou Duplantier	82	91	0.1	0.1

Source: U.S. Army Corps of Engineers, New Orleans District

The channel bottom will be paved with an 8-inch thick layer of reinforced concrete. The channel side slope paving thickness will vary. Only 4 inches of reinforced concrete will be placed in the upper two-thirds of the channel slope, with 6 inches placed in the lower one-third. Reinforced concrete cutoff walls will be located at the top-of-bank and at the bottom slope interface beneath the paving to prevent undermining of the foundation materials. A drainage system that would dissipate any excess hydrostatic pressure will be required. The system will consist of weep holes, filter fabric, and filter sand placed beneath both the six-inch side slope and 8-inch bottom paving. A reinforced concrete-lined drainage ditch will be constructed on each side of the finished top of bank to intercept excess runoff (see Plate 48).

The clearing and snagging work will be performed well within existing public rights-of-way. It is anticipated that access to this work may be somewhat limited in some locations. The proposed widening and paving of the North Branch Tributary will be done immediately adjacent to developed residential and commercial properties. While an existing right-of-way on this reach is adequate to accommodate the proposed project, the adjacent property boundaries will limit accessibility. Much of the work access will be from inside the tributary itself. Temporary fuseplug dams will also be required to dewater section to facilitate the placement of concrete. Overall,

project constructability appears to be moderately-to-fairly difficult.

The total construction duration of the Tentatively Selected Plan for Ward Creek is 1-1/2 years.

Relocations and Removals

There are no roadway or utility relocations proposed for the Ward Creek project. The channel paving final design for the North Branch Tributary will accommodate existing facilities.

Real Estate

All proposed channel work will be within existing rights-of-way suitable for construction of the project. Construction access will be obtained from publicly owned bridge crossing rights-of-way. The possibility exists that some additional access may be required in a few locations and additional temporary construction easements may be required. Mitigation needs will require the purchase of 28 acres of cleared land for reforestation. Mitigation lands will be purchased in fee, excluding mineral rights. Approximately 7 acres of existing open borrow pits are needed for spoil disposal. East Baton Rouge Parish will obtain a disposal easement from the landowners in order to use these pits. This area is also controlled by the Pontchartrain Levee District. The parish will obtain a permit (Letter of No Objection) from the Levee District once they have obtained the easement from the landowners.

Mitigation

The mitigation feature of the tentatively selected plan consists of reforestation of 28 acres of existing cleared land. It was determined to be practicable to combine mitigation sites for the tentatively selected plan for all watersheds. Two sites will be utilized. See Plates 52 and 53. The required 28 acres for this watershed's tentatively selected plan will be included as a portion of the entire habitat mitigation package for all five watersheds.

Recreation

No recreational features were determined to be suitable for inclusion on this watershed of the project.

Aesthetics

For aesthetic purposes, a top-of-bank tree replanting plan is proposed and consists of 1.5 miles of tree and shrub line planting along both sides of Ward Creek for a total of 3 miles. These plantings occur in areas of impact relative to channel improvement involving clearing of top-of-bank vegetation. Replacing trees and shrubs lost during construction will return aesthetic conditions to the pre-project condition. See Table 3 of the Environmental Appendix which identifies tree and shrub requirements and cost per watershed.

Cultural Resources

Preliminary investigations indicate that no significant cultural resources will be impacted by the tentatively selected plan and that the project area is considered to have a very low probability for containing such sites.

Stream Gaging

The U.S. Geological Survey has an existing parish-wide stream gaging program that includes installations in this watershed. Improvements are proposed for 7 gages as listed in Table 87. Data from these gages will be used in both the final project design and in monitoring the effectiveness of the project. Gages will be upgraded as part of this project's construction and then will be maintained by the U.S. Geological Survey as part of their existing parish program.

Operation and Maintenance (O&M)

Required O&M for the channels consist of continuous inspection and debris removal, annual herbicide application, and pavement repair when necessary. Clearing and snagging of the earthen channels will be performed every 5 to 10 years as

needed. Maintenance of combined project mitigation areas is also necessary and such costs have been prorated to the overall O&M of this watershed's tentatively selected plan. Herbicide spraying would be conducted in accordance with the Environmental Protection Agency's guidelines. Operation and maintenance of the above listed stream gages is also required as part of this plan.

TABLE 87

PROPOSED STREAM GAGING PROGRAM ADDITIONS FOR WARD CREEK

Location	Description
Ward Creek at Siegen Lane	Add peak discharge & rain gage
Ward Creek at Burden Drive	Stage recorder & peak discharge
Ward Creek at Bluebonnet Road	Crest-stage gage
N. Br. Ward Creek at Jefferson Hwy	Stage recorder & peak discharge
Dawson Creek at Quail Drive	Crest-stage gage
Dawson Creek at Staring Lane	Crest-stage gage
Bayou Duplantier at Lee Drive	Add peak discharge

Source: U.S. Army Corps of Engineers, New Orleans District

Environmental and Social Effects

The only significant long term environmental impact of the tentatively selected plan is the destruction of 22 acres of bottomland hardwood forests. This loss will be mitigated with the planting and maintenance of 28 acres of existing cleared land. There will be short term effects on stream water quality during construction. Aquatic habitat will receive adverse impacts from reduced diversity and increased in-stream temperatures. The loss of screening vegetation along the channel banks would result in a significant aesthetic loss. However, this loss would be mitigated by the planting with both trees and shrubs on both sides of 1.5 miles of channel.

The most significant beneficial social impact of this plan would be the relief from flooding to those affected. Also, some major property erosion problems would be mitigated by this plan (see discussion below).

Economic Benefits

The tentatively selected plan would generate significant economic benefits from flood damage reduction to existing, and, to some extent, projected future development. Benefits were only quantified, however, for existing development. It is estimated that average annual damages would be reduced by about 60 percent in the North Branch Tributary basin. Damage reduction of about 15 percent is anticipated throughout the remaining watershed. A breakdown of these anticipated benefits are shown in Table 88.

In addition to the above direct and indirect flood damage reduction benefits, the proposed paving of channels in this watershed will have a significant beneficial impact on existing property erosion problems on the North Branch Tributary. As stated above, streambank erosion is severe on the North Branch Tributary. In some locations, large sections of private property are sloughing down into the channel banks. See photos, Figure 1. Continuation of this process will certainly damage private structures and severely devalue these properties. There are several major litigations filed by private owners against East Baton Rouge Parish claiming damage relief from this problem. Short-term efforts to mitigate the erosion problem have been ineffective (see photos, Figure 1).

As discussed above for Jones Creek, several factors were considered in developing a methodology to quantify the benefits associated with abating the erosion problem. A conservative approach was developed that consisted of estimating the erosion rate of each stream reach and combining it with the average land square foot real estate value of the area. See Engineering and Economic Appendix. While the actual soils directly eroded are within the existing channel right-of-way and have little value, there is almost an immediate "translation" of the soils loss as the top of bank section, well beyond the public right-of-way, creeps and/or sloughs down the stream embankment.

Applying estimated erosion rates in conjunction with estimated property land values, equivalent annual damages were calculated. The proposed paving of North Branch will abate

these damages and this value was therefore included as an economic benefit produced by this project.

Final Costs, Net Benefits

Final costs and benefits for the tentatively selected plan by feature are shown in Table 88. Complete itemized costs by account code feature are shown in Table 89. The total first cost of the tentatively selected plan, including all items, is estimated to be $9,470,000. Total tentatively selected plan annual operation and maintenance costs, including all features, is estimated at $76,000 per year. Project first costs were converted to equivalent annual dollars using an interest rate of 8.00 percent over a 50-year period. It has been determined that estimated equivalent annual costs and benefits will generate $161,000 per year net benefits. The benefit-cost ratio is 1.17 to 1.

Construction of each watershed's tentatively selected plan will be phased. Construction of the tentatively selected plan for Ward Creek is scheduled to start in 1999. Fully-funded cost estimates in accordance with this construction schedule are shown in Plan Implementation.

Cost-Sharing

A breakdown of incremental and fully-funded cost-sharing requirements for the tentatively selected plan is shown in Plan Implementation. The local sponsor will be responsible in providing and/or bearing the full costs of all required lands, easements, rights-of-way, relocations, and disposal areas for this project. The local sponsor will also bear 100 percent of annual operation and maintenance, and, all replacement costs.

TABLE 88
WARD CREEK
PROJECT COSTS AND BENEFITS FOR THE TENTATIVELY SELECTED PLAN
(1994 DOLLARS, 8.00% INTEREST, 50-YEAR PERIOD)

FIRST COSTS	
CONSTRUCTION FEATURE	$ 9,470,000
GROSS INVESTMENT (includes interest lost during construction)	$10,371,000
AVERAGE ANNUAL COSTS	
INTEREST/AMORTIZATION	$ 848,000
OPERATION/MAINTENANCE	$ 76,000
TOTAL AVERAGE ANNUAL COSTS	$ 924,000
AVERAGE ANNUAL BENEFITS*	
INUNDATION REDUCTION	$ 881,000
FIA COSTS SAVED	$ 18,000
REDUCED EMERGENCY COSTS	$ 32,000
FILL REDUCTION	$ 2,000
RECREATION	$ 0
EROSION CONTROL	$ 88,000
BENEFITS DURING CONSTRUCTION	$ 64,000
TOTAL AVERAGE ANNUAL BENEFITS	$ 1,085,000
BENEFIT/COST RATIO	1.17

* CALCULATED WITH PROPOSED COMITE RIVER DIVERSION CANAL IN PLACE

SOURCE: U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT

TABLE 89
WARD CREEK - TENTATIVELY SELECTED PLAN
CHART OF ACCOUNTS

Account Code	Item	Quantity	Unit	Unit Price	Amount	Contingencies	Project Cost
01---	LANDS AND DAMAGES						
	Construction						
	Acquisitions						
01B1-	By Government				5,060	1,330	6,390
01B2-	By Local Sponsor(LS)				1,940	510	2,450
01B4-	Review Of LS				2,260	590	2,850
01G--	Temporary Permits						
01G1-	By Government				2,310	610	2,920
01G2-	By LS				3,460	910	4,370
01G4-	Review of LS				490	130	620
01R--	Real Estate Payments						
01R1-	Land Payments						
01R1B	By LS				1,330	1,330	2,660
01T--	LERRD Credits						
01T1-	Land Payments				11,120	2,920	14,040
01T2-	Administrative Costs				5,870	1,540	7,410
01T4-	Other				3,400	890	4,290
01---	Subtotal: Lands And Damages (Construction)						37,240
	Contingencies						10,760
01---	Subtotal: Lands And Damages (Construction)						48,000
	Mitigation						
01B1-	By Government				320	80	400
01B2-	By Local Sponsor(LS)				500	130	630
01B4-	Review Of LS				90	20	110
01C--	Condemnations						
01C2	By LS				100	30	130
01C4-	Review of LS				50	10	60
01E--	Appraisals						
01E3-	By LS				490	130	620
01E5-	Review of LS				120	30	150
01F--	PL 91-646 Assistance						
01F1-	By Government				50	10	60
01F4-	Review Of LS				20	10	30
01G--	Temporary Permits						
01G1-	By Government				140	40	180
01G2-	By LS				200	50	250
01G4-	Review of LS				40	10	50
01R--	Real Estate Payments						
01R1-	Land Payments						
01R1B	By LS				82,400	20,940	103,340
01T--	LERRD Credits						
01T1-	Land Payments				220	60	280
01T3-	PL 91-646 Assistance				220	60	280
01T2-	Administrative Costs				280	70	350
01T4-	Other				60	20	80
01---	Subtotal: Lands And Damages (Mitigation)						85,300
	Contingencies						21,700
01---	Subtotal: Lands And Damages (Mitigation)						107,000
01---	TOTAL: LANDS AND DAMAGES						155,000

Account Code	Item	Quantity	Unit	Unit Price	Amount	Contingencies	Project Cost
06------	FISH AND WILDLIFE FACILITIES						
0603----	Wildlife Facilities And Sanctuaries						
060301--	Mob And Demob						
060371--	Fences						
06037102	Fencing	1,838	LF	5.45	10,017	2,828	12,845
060373--	Habitat And Feeding Facilities						
06037302	Planting	32	AC	150.00	4,800	1,355	6,155
06------	Subtotal: Fish And Wildlife Facilities						14,817
	Contingencies						4,183
06------	TOTAL: FISH AND WILDLIFE FACILITIES						19,000
09------	CHANNELS AND CANALS						
0901----	Channels						
090101--	Mob & Demob	Lump Sum	LS	150,000.00	150,000	36,806	186,806
09011502	Clearing For Channel Dredging	20	AC	5,900.00	118,000	28,954	146,954
09011502	Excavation	143,000	CY	6.75	965,250	236,850	1,202,100
09011502	Clearing and Snagging	13	MI	19,000.00	247,000	60,608	307,608
09013002	Sand (8" Thick)	13,200	CY	10.50	138,600	34,009	172,609
09013002	Filter Drain Fabric	59,300	SY	7.50	444,750	109,131	553,881
09013002	Fuseplug Dams	Lump Sum	LS	40,000.00	40,000	9,815	49,815
09013003	Concrete Lining						
	Cutoff Wall	400	CY	150.00	60,000	14,723	74,723
	Channel Slope Pavement (4")	8,800	CY	130.00	1,144,000	284,810	1,428,810
	Channel Slope Pavement (6")	6,600	CY	150.00	990,000	246,510	1,236,510
	Channel Slab Pavement (8")	4,500	CY	150.00	675,000	165,629	840,629
	Drain Ditch	2,200	CY	130.00	286,000	70,178	356,178
09019902	Construction Access						
	Excavation	6,500	CY	7.25	47,125	11,563	58,688
	Filter Fabric	19,400	SY	3.50	67,900	16,661	84,561
	Crushed Stone	9,000	TN	24.00	216,000	53,001	269,001
	Obstruction Removal	5,600	LF	10.00	56,000	13,741	69,741
09019905	Fencing (chain link)	11,200	LF	8.25	92,400	22,673	115,073
09019906	Aesthetic Plantings						
	Tree Planting	650	EA	15.00	9,750	2,438	12,188
	Shrub Planting	1,100	EA	11.00	12,100	3,025	15,125
09------	SUBTOTAL: Channels And Canals						5,759,875
	Contingencies						1,421,125
09------	TOTAL: CHANNELS AND CANALS						7,181,000
29---	PROJECT COOPERATION AGREEMENTS						
29A--	Draft PCA						
29A9-	All Other				800	200	1,000
29B--	Final PCA and Financial Plan						
29B9-	All Other				800	200	1,000
29C--	PCA Negotiations						
29C9-	All Other				800	200	1,000
29---	Subtotal: Project Cooperation Agreements						2,400
	Contingecies						600
29---	TOTAL: PROJECT COOPERATION AGREEMENTS						3,000

Account Code	Item	Quantity	Unit	Unit Price	Amount	Contingencies	Project Cost
30---	ENGINEERING AND DESIGN						
30C--	Design Memorandum				595,000	118,000	713,000
30CD-	HTRW Studies				123,000	12,000	135,000
30CF-	Cost Estimates				18,000	4,000	22,000
30CN-	VE Studies				30,000	6,000	36,000
30DA-	P&S				187,000	37,000	224,000
30DF-	Cost Estimates				14,000	3,000	17,000
30DN-	VE Studies				5,000	1,000	6,000
30DA-	P&S - Mitigation				7,000	2,000	9,000
30DS-	Construction Contract Award Activities				10,000	2,000	12,000
30DV-	Engineering During Construction				28,000	6,000	34,000
30E--	Engineering And Design Phase Project Management				81,000	16,000	97,000
30Z--	Misc. Activities						
	Monitoring						
	Install Gages				22,000	4,000	26,000
	Preconstruction O&M For Gages				120,000	24,000	144,000
	PMO				50,000	10,000	60,000
	LMVD				13,000	3,000	16,000
30---	SUBTOTAL: Engineering And Design						1,303,000
	Contingencies						248,000
30---	TOTAL: ENGINEERING AND DESIGN						1,551,000
31---	CONSTRUCTION MANAGEMENT						
31B--	Contract Administration						
31B3-	Review And Approval of Contract Payments				19,000	4,000	23,000
31B4-	Contract Modifications				45,000	9,000	54,000
31B5-	Progress And Completion Reports				15,000	3,000	18,000
31B9-	All Other				65,000	13,000	78,000
31D--	Review of Shop Drawings						
31D0-	Review of Shop Drawings				15,000	3,000	18,000
31E--	Inspection & Qual. Assur.						
31E1-	Schedule Compliance				15,000	3,000	18,000
31E2-	Compliance Sampling And Testing				14,000	3,000	17,000
31E3-	Quality Surveys				30,000	6,000	36,000
31E4-	Title II Services				17,000	3,000	20,000
31E9-	All Other				199,000	40,000	239,000
31T--	Construction Phase Project Management				33,000	7,000	40,000
31---	SUBTOTAL: Construction Management						467,000
	Contingencies						94,000
31---	TOTAL: CONSTRUCTION MANAGEMENT						561,000
	TOTAL: WARD CREEK						9,470,000

Risk and Uncertainty

A modified risk and uncertainty analysis was performed on calculated benefits and costs of the Tentatively Selected Plan. In general, statistical ranges used in this analysis were broad and were established primarily for the purposes of identifying the direction of change that may be expected due to known uncertainties. The single value estimates calculated above were, therefore, used as the basis for determining the ultimate cost-effectiveness of the plan.

Six items were identified as having potential major variance on the overall project's feasibility. These items and their estimated variance ranges are discussed below. Additional detail of the analysis can be found in Economics Appendix H.

- Stage Frequency Values.

  Without project (existing) and with project floodstage frequency values directly affect existing and with project calculated damage dollar values. Variances on both existing and with project stages were determined to be practicably within plus or minus 1.0 feet for all storm frequency events, and, for both without and with project conditions. See Engineering Appendix C. Damage values were recalculated incorporating this range. Applying the results, it is estimated that without project flood damages vary from minus $1,953,000 to plus $4,950,000 per year from the most likely estimate. With project flood damages are estimated to vary from minus $1,462,000 to plus $3,469,000 per year from the most likely estimate. Note that it was determined that there is likely to be a very high correlation between existing and with project stage frequency variance. This is due to the fact that the majority of the project calls for clearing and snagging only, which will not significantly alter channel configuration. A correlation factor of 0.95 was applied to this item in the "risk analysis" calculations described below.

- Structure Elevations.

  Variances in structure elevations directly affect both existing and with project calculated damage dollar values. Within practical limits, structure elevation variance was determined to be minus 0.5 to plus 0.5 feet. The calculated dollar value variance is minus $975,000 to plus $2,480,000 for existing annual damages, and, minus $730,000 to plus $1,740,000 for with project annual damages. Note that there is a direct correlation between existing and with project variances. A correlation factor of 1.0 was therefore applied to this item in the "risk analysis" calculations described below.

- Structure Valuations.

  Variances in the estimate of structure values also affect both existing and with project calculated damage dollar value. Structure value variance range is estimated at minus 10 percent to plus 10 percent from the single value estimate. Damage values were recalculated incorporating this range. Applying these results, it is estimated that existing flood damages vary from minus $277,000 to plus $260,000 per year. With project flood damages range from minus $203,000 to plus $191,000. As in the case of structure elevation variance, there is a one-to-one correlation between existing and with project probability ranges.

- Construction Costs.

  Estimated variances in calculated quantities, unit prices, constructability, and other factors were considered in calculating the channel construction cost estimate. The calculated cost range is from minus $3,600,000 to plus $430,000 per year relative to the single value estimate used for this item. Converting this range to equivalent annual dollars yields minus $360,000 to plus $43,000 per year.

- Erosion Abatement Benefits.

  The estimated annual benefits calculated for erosion abatement are quite speculative. A plus or minus range of 50 percent should be considered for this item. This adjustment range is minus $45,000 to plus $45,000 per year.

- Property Utility Values

  In addition to the loss of "land" property, the strong probability exists that significant or entire property utility values will be lost over time if the channels in this watershed are not paved. That is to say, for example, that an existing home purchased at $75,000 may not be able to be sold at any price if the backyard has sloughed into the channel. Furthermore, it is quite likely that unabated erosion will result in direct damage to structures, given time. Through field investigation, it is estimated that up to ten residential and one 3-story office building properties could lose their utility values within five years given present conditions. It was estimated that a potential loss of $33,000 per each residential property ($330,000), plus a $2,000,000 loss for the office building could occur in five years. Discounting over the five year period and conversion to annual dollars yields $158,000 per year. Since this item was not considered in the most likely estimate of benefits for this plan, a range of minus $0 to plus $158,000 per year was considered for this additional item.

The above uncertainty spreads were integrated with the single most likely value estimates for existing annual damages, with project damages and project costs. With the aid of "At Risk" computer software, probability ranges were calculated. See Risk Analysis calculations in Economics Appendix H. The calculated probability distributions for project cost, benefits, net benefits, and benefit-to-cost ratio are illustrated in Figures 14 through 17.

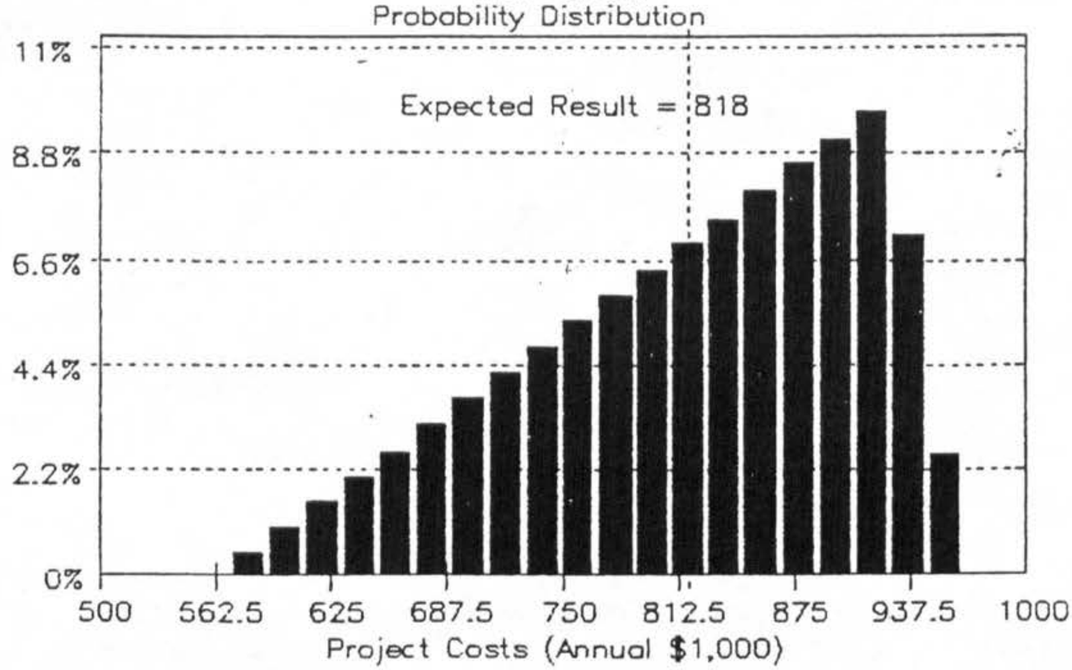
The calculated expected values generated as compared to the single value estimates were determined as follows:

(EQUIVALENT ANNUAL)	SINGLE VALUE ESTIMATE	CALCULATED EXPECTED VALUE
PROJECT BENEFITS	$1,085,000	$1,631,000
PROJECT COSTS	$ 924,000	$ 818,000
NET BENEFITS	$ 161,000	$ 813,000
BENEFIT/COST RATIO	1.17	2.0
PROBABILITY OF PROJECT NET POSITIVE BENEFITS	N/A	97%

These results show an expected substantial increase in project benefits. This increase was due primarily to the high sensitivity of both calculated existing and with project damages, given a flood stage frequency or structure elevation variance of plus or minus 1.0 foot. This effect is somewhat compounded given the fact that a relatively high percentage of flood damages remains in the watershed with the tentatively selected plan in place.

While there appears to be some heavier flooding on the North Branch Tributary than that calculated, there is no substantial evidence that flooding in the remaining watershed is grossly underestimated as the sensitivity analysis indicates as probable. It is, therefore, believed that the large increase in the expected value of property benefits is not truly indicative of the actual situation. These results do, however, indicate that the expected net benefits for this watershed's tentatively selected plan is likely to be significantly higher than the calculated single value estimate.

Figure 14
Ward Creek
Probability Distribution



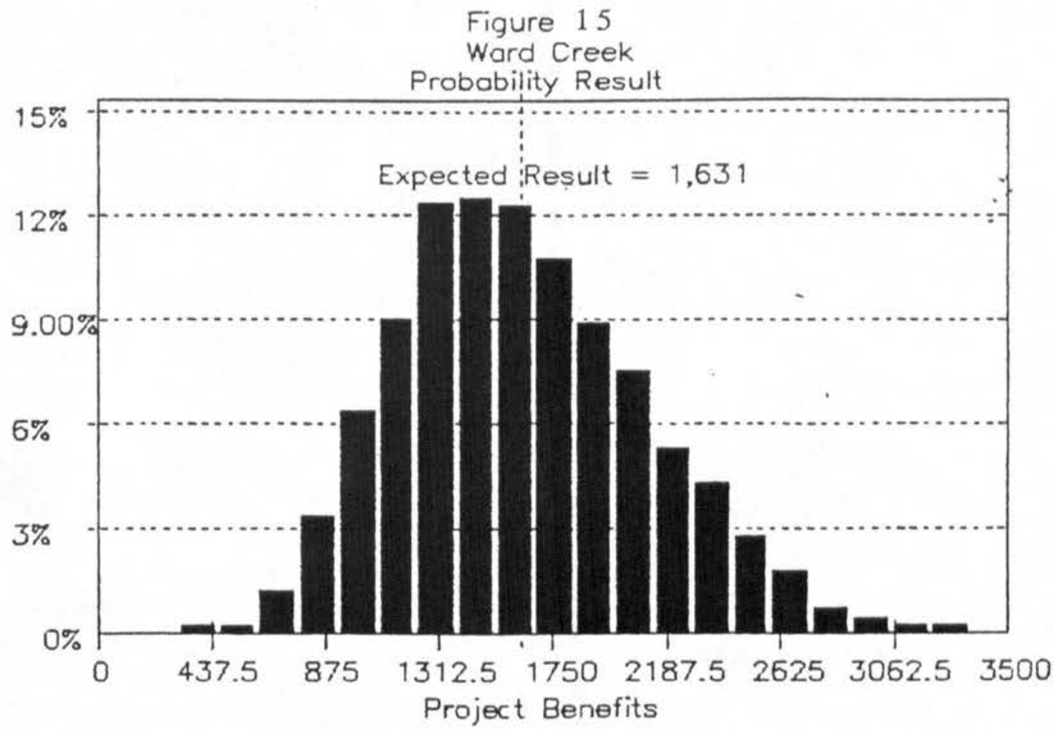


Figure 15
Ward Creek
Probability Result
Expected Result = 1,631
15%
12%
9.00%
6%
3%
0%
0
437.5
875
1312.5
1750
2187.5
2625
3062.5
3500
Project Benefits

Figure 16
Ward Creek
Probability Distribution

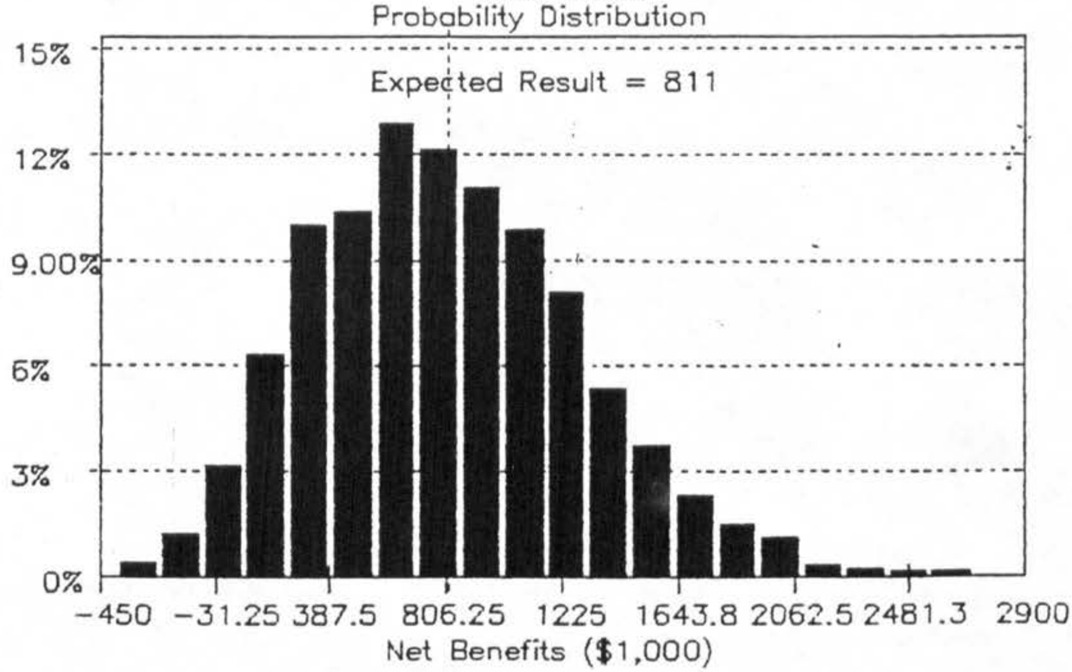
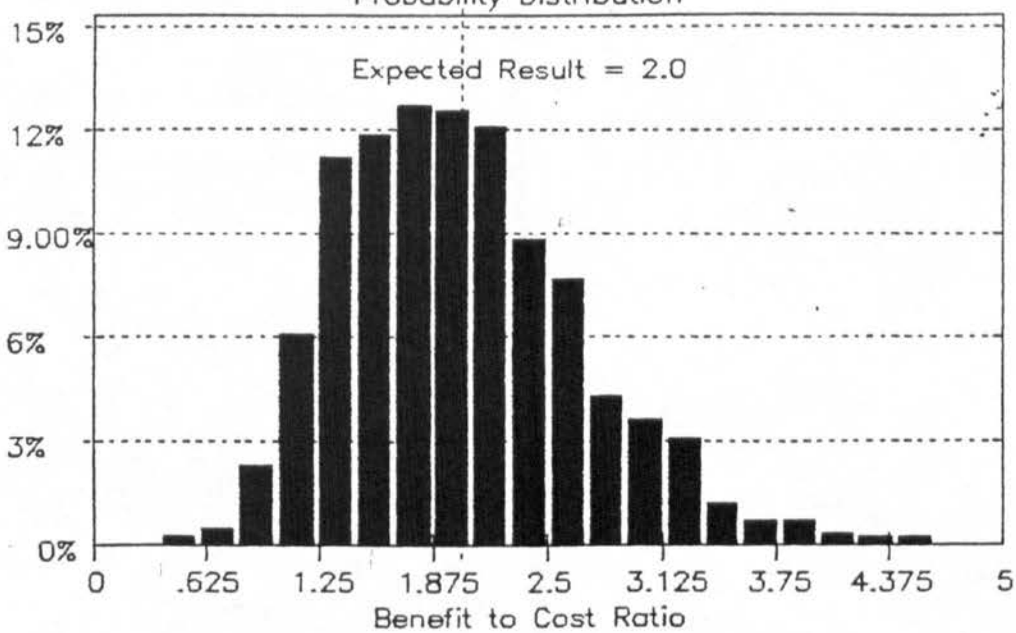


Figure 17
Ward Creek
Probability Distribution



BAYOU FOUNTAIN

Description

The tentatively selected plan for Bayou Fountain consists of clearing and/or widening approximately 11 miles of channel. Proposed modifications are designed to convey a 10-year storm event within streambank and reduce out-of-bank stages of larger flood events. Improvements are proposed from the bayou's mouth at Bayou Manchac upstream to Ben Hur Road.

Clearing and snagging is proposed from the bayou's mouth upstream to Siegen Lane and again from Gardere Lane upstream to Ben Hur Road. Between Siegen and Gardere Lanes, channel widening is proposed and consists of a 50-foot wide bottom with 3:1 bank slopes. Proposed channel modifications are listed in summary in Table 90 and are shown on Plate 46.

TABLE 90

BAYOU FOUNTAIN - TENTATIVELY SELECTED PLAN
PROPOSED CHANNEL MODIFICATIONS

Reach	Proposed Modifications
Mouth to Siegen Lane	Channel clearing and snagging
Siegen Lane to	Channel widening - (earthen) 50-ft
Gardere Lane	bottom width with 3:1 bank slopes
Gardere Lane to Ben Hur Road	Channel clearing and snagging
	Construct concrete "U"-channel at 60-inch sewer line; 50-ft bottom width

Source: U.S. Army Corps of Engineers, New Orleans District

Plan Effectiveness

The tentatively selected plan is designed to convey and contain a 10-year storm event within the streambank. Flood stages of greater storm events will also be reduced. Expected stage lowerings for various storm events at selected locations in the watershed are shown in Table 91 and Plate 59. Overflow maps, illustrating existing and with project floodplains are shown in the Engineering Appendix C. The expected reduction in floodstages will result in a substantial lowering in the number of structures located in the 0-25-year floodplain (see Table 92).

Development in this watershed is occurring at a rapid pace. By the year 2040, urbanization in this watershed is projected to increase from 26 to 65 percent. Estimates from hydrologic modelling indicate that the 10-year with project average stage will be about 1.1 feet higher and the average 100-year flood stages about 0.3 feet higher. This increase in urbanization will seriously impact the effectiveness of the proposed channel modifications and also significantly increase existing flooding conditions without the proposed project.

To ensure the effectiveness of the tentatively selected plan for this watershed, it will therefore be required that the parish implement a comprehensive floodplain management plan in conjunction with the proposed channel modifications. Specifics of this floodplain management plan are discussed below at the end of this section.

TABLE 91

BAYOU FOUNTAIN - TENTATIVELY SELECTED PLAN
EXPECTED PROJECT STAGE REDUCTIONS (FT)

Event	Siegen Lane	Gardere Lane	Ben Hur Road
1-YR	0.7	2.4	1.0
2-YR	0.3	2.3	1.0
5-YR	0.0	1.9	0.7
10-YR	0.0	1.7	0.7
25-YR	0.0	1.6	0.6
50-YR	0.0	1.4	0.5
100-YR	0.0	1.1	0.5
200-YR	0.0	1.1	0.3
500-YR	0.0	0.9	0.0

Source: U.S. Army Corps of Engineers, New Orleans District

TABLE 92

BAYOU FOUNTAIN
NUMBER OF STRUCTURES LOCATED IN THE VARIOUS FLOODPLAINS
WITH AND WITHOUT THE TENTATIVELY SELECTED PLAN
(WITH COMITE RIVER DIVERSION CANAL IN PLACE)

BASIN NO.	STRUCTURE CATEGORY	0-10 YEAR	10-25 YEAR	25-50 YEAR	50-100 YEAR	100-500 YEAR	ABOVE 500 YEAR	ALL FLOOD ZONES
BAYOU FOUNTAIN								
	WITHOUT PROJECT							
29	1-STORY	41	121	34	34	531	432	1,193
	2-STORY	7	50	112	6	196	133	504
	MOBILE HOME	0	0	0	0	0	6	6
	APT.BLDGS.	39	125	101	10	54	39	368
	COMMERCIAL	8	21	12	45	112	82	280
	TOTAL	95	317	259	95	893	692	2,351
	WITH TENTATIVELY SELECTED PLAN							
	1-STORY	25	40	26	136	490	476	1,193
	2-STORY	1	14	0	156	115	218	504
	MOBILE HOME	0	0	0	0	0	6	6
	APT.BLDGS.	37	127	76	33	56	39	368
	COMMERCIAL	7	18	11	46	99	99	280
	TOTAL	70	199	113	371	760	838	2,351

SOURCE: U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT

Design and Construction

Existing soils data from available sources were used in determining channel design slopes and possible erosion protection (see Engineering Appendix C). A channel slope design of 1V on 3.0H was determined to be necessary to reasonably ensure bank stability in the Siegen Lane to Gardere Lane reach. All new streambanks will remain earthen with grass cover.

It is proposed that improvements be made to one major obstruction, a 60-inch sewer main crossing located at Mile 53.8. The proposed design calls for the construction of a

concrete "U-channel" with a 50-foot bottom width. Construction of the channel will be performed by mechanical dredge (bucket) with approximately 283,000 cubic yards of material to be excavated. The excavated material will be disposed of by truck hauling to abandoned borrow pits on the Mississippi River batture close to this watershed (about 4 miles on average). This disposal location is located closer to the project area versus the parish landfill and, therefore, was changed from the initial plans to significantly reduce construction cost. See Plate 50. Non-vegetative "trash" removed from the channels will, however, still be hauled to the parish landfill. Clearing and snagging work will be performed within the low top of bank contour. It is anticipated that the work will be accomplished using chain saws and transloaders. Debris removed will be disposed of by truck to the above noted river batture site. Structural improvements will be required at an existing 60-inch sewer main crossing. A soil founded reinforced concrete U-shaped monolith, used in conjunction with reinforced concrete wing walls, will be utilized.

All proposed work will likely be performed from the top of the bank and inside the channel. Once the purchase of required project right-of-way is complete, total accessibility along the top of the bank will be available. Overall, project constructability appears to be only moderately difficult.

It is estimated that project construction for this watershed will take about two years.

Relocations and Removals

There is one 4-inch petroleum products pipeline relocation required to implement the tentatively selected plan.

Real Estate

The tentatively selected plan will require the permanent purchase of 122 acres and 30 acres of temporary easement for channel construction, plus 21 acres for mitigation. No structures or other improvements will be taken for this project. Land purchased for channel widening (122 acres) will be perpetual drainage easements. Temporary construction easements (30 acres) will be acquired (purchased) for proposed

clearing and snagging reaches. Mitigation areas will be bought in fee, excluding mineral rights. Approximately 14 acres of existing open borrow pits are needed for spoil disposal. East Baton Rouge Parish will obtain a disposal easement from the landowner(s) in order to use these pits. This area is also controlled by the Pontchartrain Levee District. The parish will obtain a permit (Letter of No Objection) from the Levee District once they have obtained easements from the landowner(s).

Mitigation

The mitigation feature of the tentatively selected plan consists of reforestation of 21 acres of existing cleared land. It was determined to be practicable to combine mitigation sites for the tentatively selected plan for all watersheds. Two sites will be utilized. See Plates 52 and 53. The required 22 acres for this watershed's tentatively selected plan will be included as a portion of the entire habitat mitigation package for all five watersheds.

Recreation

The Bayou Fountain watershed does not lend itself to recreational development in association with the tentatively selected plan.

Aesthetics

For aesthetic purposes, a top-of-bank tree replanting plan is proposed and consists of 2.5 miles of tree and shrub line planting along both sides of Bayou Fountain for a total of 5 miles. These plantings occur in areas of impact relative to channel improvement involving clearing of top-of-bank vegetation. Replacing trees and shrubs lost during construction will return aesthetic conditions to the pre-project condition. See Table 3 of the Environmental Appendix which identifies tree and shrub requirements and cost per watershed.

Cultural Resources

Preliminary investigations indicate that four potentially significant sites are likely to occur in the project area and that there is some chance of uncovering unknown sites. Impacts from the proposed channel enlargement reach will likely be more significant than those occurring in the proposed clearing and snagging areas. A detailed survey will be conducted during the preconstruction design phase. If necessary, channel designs can likely be altered in order to not disturb any located sites. These efforts will be coordinated with the State Historic Preservation Officer (SHPO).

Stream Gaging

The U.S. Geological Survey has an existing parish-wide stream gaging program that includes installations in this watershed. Improvements are proposed for the gage at Gardere Lane. Data from these gages will be used in both the final project design and in monitoring the effectiveness of the project. Gages will be upgraded as part of this project's construction and then will be maintained by the U.S. Geological Survey as part of their existing parish program.

Operation, Maintenance, Repair, and Rehab (O&M)

Required O&M for the channels consist of continuous inspection and debris removal, annual herbicide application, and clearing and snagging every 5 to 10 years, where necessary. Herbicide spraying would be conducted in accordance with the Environmental Protection Agency's guidelines (see Appendix E). Maintenance of combined project mitigation areas is also necessary and such costs have been prorated to the overall O&M of this watershed's tentatively selected plan. Operation and maintenance of the above listed stream gages to also required as part of this plan.

Environmental and Social Effects

The only significant long term environmental impact of the tentatively selected plan is the destruction of 17 acres of bottomland hardwood forests. This loss will be mitigated with the planting and maintenance of 21 acres of existing cleared

land. There will be short term effects on stream water quality during construction. Aquatic habitat will receive adverse impacts from reduced diversity and increased in-stream temperatures. The loss of screening vegetation along the channel banks would result in a significant aesthetic loss. However, this loss would be mitigated by the planting with both trees and shrubs on both sides of 2.5 miles of channel.

The most significant beneficial social impacts of this plan would be the relief from flooding to those affected. Adverse social impacts include the taking of some unimproved private property. Temporary traffic rerouting for a bridge relocation is also necessary during construction of the plan.

Economic Benefits

The tentatively selected plan would generate significant economic benefits from flood damage reduction to existing, and, to some extent, projected future development. Benefits were only quantified, however, for existing development. It is estimated that annual average damages in this watershed would be reduced by about 50 percent. A breakdown of these anticipated benefits are shown in Table 93.

Final Costs, Net Benefits

Final costs and benefits for the tentatively selected plan by feature are shown in Table 93. Complete itemized costs by account code feature are shown in Table 94. The total first cost of the tentatively selected plan, including all items, is estimated to be $4,760,000. Total tentatively selected plan annual operation and maintenance costs, including all features, is estimated at $37,000 per year. Project first costs were converted to equivalent annual dollars using an interest rate of 8.00 percent over a 50-year period. It has been determined that estimated equivalent annual costs and benefits of the tentatively selected plan will generate $78,000 per year net benefits. The benefit-cost ratio is 1.16 to 1.

Construction of each watershed's tentatively selected plan will be phased. Construction of the tentatively selected plan for Bayou Fountain is scheduled to start in 1997. Fully-funded

cost estimates in accordance with this construction schedule are shown in the Plan Implementation section below.

Cost-Sharing

A breakdown of incremental and fully-funded cost-sharing requirements for the tentatively selected plan is shown in Plan Implementation. The local sponsor will be responsible in providing and/or bearing the full costs of all required lands, easements, rights-of-way, relocations, and disposal areas for this project. The local sponsor will also bear 100 percent of annual operation and maintenance, and, all replacement costs.

Floodplain Management

As stated above, the anticipated rapid urbanization of this watershed basin will significantly and adversely affect flooding conditions with or without the proposed project. It is therefore necessary that the parish implement a comprehensive plan that will control this process.

Currently, East Baton Rouge has in place a parish-wide ordinance that includes the prohibiting of floodplain displacement (see Appendix K). This means that no fill material can be brought into the floodplain unless an equal amount of fill is removed, thus maintaining holding volume. Additionally, the Federal Emergency Management Agency will institute a "floodway" along Bayou Fountain. This will severely inhibit development within a zone immediately adjacent to the bayou.

While both existing programs will help reduce additional future flooding, they do not address the impending effects of future land use conversion from forested land to urban (paved). This transaction will increase peak flow rates in Bayou Fountain as stormwater will travel faster to the stream given the anticipated substantial increase in deforested-paved areas. To limit this effect, the parish must institute a basin-wide (Bayou Fountain) ordinance that requires developers to "maintain the existing run-off status" of their existing property tracts. This can readily be achieved by including some form of stormwater storage (detention ponds). This management plan is essential to the overall comprehensiveness

of the tentatively selected plan in the Bayou Fountain watershed. <u>Ultimate approval of Federal participation for the Bayou Fountain portion of the tentatively selected plan is contingent on the parish's commitment to implementing the above floodplain management policy in this watershed</u>.

TABLE 93
BAYOU FOUNTAIN
PROJECT COSTS AND BENEFITS FOR THE TENTATIVELY SELECTED PLAN
(1994 DOLLARS, 8.00% INTEREST, 50-YEAR PERIOD)

FIRST COSTS	
CONSTRUCTION FEATURE	$4,760,000
GROSS INVESTMENT (includes interest lost during construction)	$5,420,000
AVERAGE ANNUAL COSTS	
INTEREST/AMORTIZATION	$ 443,000
OPERATION/MAINTENANCE	$ 37,000
TOTAL AVERAGE ANNUAL COSTS	$ 480,000
AVERAGE ANNUAL BENEFITS*	
INUNDATION REDUCTION	$ 506,000
FIA COSTS SAVED	$ 0
REDUCED EMERGENCY COSTS	$ 41,000
FILL REDUCTION	$ 10,000
RECREATION	$ 0
EROSION CONTROL	$ 0
BENEFITS DURING CONSTRUCTION	$ 0
TOTAL AVERAGE ANNUAL BENEFITS	$ 557,000
BENEFIT/COST RATIO	1.16

* CALCULATED WITH PROPOSED COMITE RIVER DIVERSION CANAL IN PLACE

SOURCE: U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT

TABLE 94
BAYOU FOUNTAIN - TENTATIVELY SELECTED PLAN
CHART OF ACCOUNTS

Account Code	Item	Quantity	Unit	Unit Price	Amount	Contingencies	Project Cost
01---	LANDS AND DAMAGES						
	Construction						
01B--	Acquisitions						
01B1-	By Government				9,230	2,310	11,540
01B2-	By Local Sponsor(LS)				264,090	66,050	330,140
01B4-	Review Of LS				14,910	3,740	18,650
01C--	Condemnations						
01C2	By LS				10,570	2,650	13,220
01C4-	Review of LS				8,200	2,060	10,260
01E--	Appraisals						
01E3-	By LS				283,250	71,080	354,330
01E5-	Review of LS				51,500	12,930	64,430
01G--	Temporary Permits						
01G1-	By Government				2,970	740	3,710
01G2-	By LS				21,590	5,420	27,010
01G4-	Review of LS				660	170	830
01R--	Real Estate Payments						
01R1-	Land Payments						
01R1B	By LS				263,670	66,670	330,340
01T--	LERRD Credits						
01T1-	Land Payments				12,050	3,020	15,070
01T2-	Administrative Costs				8,030	2,020	10,050
01T4-	Other				4,330	1,090	5,420
01---	Subtotal: Lands And Damages (Construction)						955,050
	Contingencies						239,950
01---	Subtotal: Lands And Damages (Construction)						1,195,000
	Mitigation						
01B--	Acquisitions						
01B1-	By Government				240	60	300
01B2-	By Local Sponsor(LS)				370	100	470
01B4-	Review Of LS				70	20	90
01C--	Condemnations						
01C2	By LS				70	20	90
01C4-	Review of LS				30	10	40
01E--	Appraisals						
01E3-	By LS				370	100	470
01E5-	Review of LS				90	20	110
01F--	PL 91-646 Assistance						
01F1-	By Government				30	10	40
01F4-	Review Of LS				10	0	10
01G--	Temporary Permits						
01G1-	By Government				100	30	130
01G2-	By LS				150	40	190
01G4-	Review of LS				30	10	40
01R--	Real Estate Payments						
01R1-	Land Payments						
01R1B	By LS				61,800	15,490	77,290

Account Code	Item	Quantity	Unit	Unit Price	Amount	Contingencies	Project Cost
01T--	LERRD Credits						
01T1-	Land Payments				170	40	210
01T3-	PL 91-646 Assistance				170	40	210
01T2-	Administrative Costs				210	50	260
01T4-	Other				40	10	50
01---	Subtotal: Lands And Damages (Mitigation)						63,950
	Contingencies						16,050
01---	Subtotal: Lands And Damages (Mitigation)						80,000
01---	TOTAL: LANDS AND DAMAGES						1,275,000
02------	RELOCATIONS						
0203----	Cemeteries, Utilities And Structures						
020318--	Utilities						
02031815	4" Petroleum Products Pipeline BF-2 Permanent Relocation	1	LS	3,000.00	3,000	1,000	4,000
0203----	SUBTOTAL: Cemeteries, Utilities And Structures						3,000
	Contingencies						1,000
0203----	SUBTOTAL: Cemeteries, Utilities And Structures						4,000
02------	TOTAL: RELOCATIONS						4,000
06------	FISH AND WILDLIFE FACILITIES						
0603----	Wildlife Facilities And Sanctuaries						
060301--	Mob And Demob						
060371--	Fences						
06037102	Fencing	1,378	LF	5.45	7,510	1,954	9,464
060373--	Habitat And Feeding Facilities						
06037302	Planting	24	AC	150.00	3,600	936	4,536
06------	Subtotal: Fish And Wildlife Facilities						11,110
	Contingencies						2,890
06------	TOTAL: FISH AND WILDLIFE FACILITIES						14,000
09------	CHANNELS AND CANALS						
0901----	Channels						
090101--	Mob & Demob	Lump Sum	LS	100,000.00	100,000	19,570	119,570
09011502	Clearing and Snagging	8	MI	19,000.00	152,000	29,747	181,747
09011502	Clearing For Channel Dredging	47	AC	5,900.00	277,300	54,268	331,568
09011502	Excavation	283,000	CY	3.90	1,103,700	215,941	1,319,641
09013002	Filter Drain Fabric	6,460	SY	7.50	48,450	9,482	57,932
09013002	Sand (8" Thick)	160	CY	7.50	1,200	235	1,435
09013002	Riprap 16" - Dry Placement	890	TN	23.00	20,470	4,006	24,476
09013003	Concrete U-Channel						
	1 Ft. U-Frame Base Slab	67	CY	180.00	12,060	2,360	14,420
	1 Ft. U-Frame Wall	100	CY	300.00	30,000	5,871	35,871
	Channel Slope Pavement (4")	55	CY	130.00	7,150	1,399	8,549
	Channel Slope Pavement (6")	43	CY	150.00	6,450	1,262	7,712
	Channel Slab Pavement (8")	62	CY	150.00	9,300	1,820	11,120
09019905	Fence (chain link)	300	LF	8.25	2,475	484	2,959
09019906	Aesthetic Plantings						
	Tree Planting	1,050	EA	15.00	15,750	3,250	19,000
	Shrub Planting	1,760	EA	11.00	19,360	3,640	23,000

Account Code	Item	Quantity	Unit	Unit Price	Amount	Contingencies	Project Cost
09------	SUBTOTAL: Channels And Canals						1,805,665
	Contingencies						353,335
09------	TOTAL: CHANNELS AND CANALS						2,159,000
29---	PROJECT COOPERATION AGREEMENTS						
29A--	Draft PCA						
29A1-	Real Estate Activities				600	100	700
29A9-	All Other				800	200	1,000
29B--	Final PCA and Financial Plan						
29B1-	Real Estate Activities				600	100	700
29B9-	All Other				800	200	1,000
29C--	PCA Negotiations						
29C1-	Real Estate Activities				500	100	600
29C9-	All Other				800	200	1,000
29---	Subtotal: Project Cooperation Agreements						4,100
	Contingecies						900
29---	TOTAL: PROJECT COOPERATION AGREEMENTS						5,000
30---	ENGINEERING AND DESIGN						
30DA-	Design Report & P&S				509,000	51,000	560,000
30DD-	HTRW Studies				105,000	10,000	115,000
30DF-	Cost Estimates				19,000	2,000	21,000
30DN-	VE Studies				5,000	1,000	6,000
30DS-	Construction Contract Award Activities				10,000	1,000	11,000
30DV-	Engineering During Construction				22,000	2,000	24,000
30DA-	P&S - Mitigation				4,000	1,000	5,000
30E--	Engineering And Design Phase Project Management				87,000	9,000	96,000
30Z--	Misc. Activities						
	Monitoring						
	Install Gages				5,000	1,000	6,000
	Preconstruction O&M For Gages				25,000	3,000	28,000
	PMO				50,000	5,000	55,000
	LMVD				10,000	1,000	11,000
30---	SUBTOTAL: Engineering And Design						851,000
	Contingencies						87,000
30---	TOTAL: ENGINEERING AND DESIGN						938,000
31---	CONSTRUCTION MANAGEMENT						
31B--	Contract Administration						
31B3-	Review And Approval of Contract Payments				13,000	3,000	16,000
31B4-	Contract Modifications				27,000	5,000	32,000
31B5-	Progress And Completion Reports				9,000	2,000	11,000
31B9-	All Other				40,000	8,000	48,000
31D--	Review of Shop Drawings						
31D0-	Review of Shop Drawings				10,000	2,000	12,000
31E--	Inspection & Qual. Assur.						
31E1-	Schedule Compliance				10,000	2,000	12,000
31E2-	Compliance Sampling And Testing				7,000	1,000	8,000
31E3-	Quality Surveys				28,000	6,000	34,000
31E4-	Title II Services				8,000	2,000	10,000
31E9-	All Other				131,000	26,000	157,000
31T--	Construction Phase Project Management				21,000	4,000	25,000

Account Code	Item	Quantity	Unit	Unit Price	Amount	Contingencies	Project Cost
31---	SUBTOTAL: Construction Management						304,000
	Contingencies						61,000
31---	TOTAL: CONSTRUCTION MANAGEMENT						365,000
	TOTAL: BAYOU FOUNTAIN						4,760,000

Risk and Uncertainty

A modified risk and uncertainty analysis was performed on calculated benefits and costs of the Tentatively Selected Plan. In general, statistical ranges used in this analysis were broad and were established primarily for the purposes of identifying the direction of change that may be expected due to known uncertainties. The single value estimates calculated above were, therefore, used as the basis for determining the ultimate cost-effectiveness of the plan.

Four items were identified as having potential major variance on the overall project's feasibility. These items and their estimated variance ranges are discussed below. Additional detail of the analysis can be found in the Economics Appendix H.

- Stage Frequency Values.

  Without project (existing) and with project floodstage frequency values directly affect existing and with project calculated damage dollar values. Variances on both existing and with project stages were determined to be practicably within plus or minus 0.5 feet for all storm frequency events, and, for both without and with project conditions. See Engineering Appendix C. Damage values were recalculated incorporating this range. Applying the results, it is estimated that without project flood damages vary from minus \$934,000 to plus \$914,000 per year from the single value estimate. With project flood damages are estimated to vary from minus \$627,000 to plus \$883,000 per year from the single value estimate. Note that it was determined that there is likely to be a high correlation between without and with project stage frequency variance. This is due to the fact that the majority of the project calls for only clearing and snagging which will not significantly alter channel configuration. A correlation factor of 0.75 was applied to this item in the "risk analysis" calculations described below.

- Structure Elevations.

  Variances in structure elevations directly affect both existing and with project calculated damage dollar values. Within practical limits, structure elevation variance was determined to be minus 0.5 to plus 0.5 feet. The calculated dollar value variance is minus $934,000 to plus $914,000 for existing annual damages, and, minus $627,000 to plus $883,000 for with project annual damages. Note that there is a direct correlation between existing and with project variances. A correlation factor of 1.0 was therefore applied to this item in the "risk analysis" calculations described below.

- Structure Valuations.

  Variances in the estimate of structure values also affect both existing and with project calculated damage dollar value. Structure value variance range is estimated at minus 10 percent to plus 10 percent from the calculated single value. Damage values were recalculated incorporating this range. Applying these results, it is estimated that existing flood damages vary from minus $226,000 to plus $92,000 per year. With project flood damages range from minus $177,000 to plus $45,000.

- Construction Costs.

  Estimated variances in calculated quantities, unit prices, constructability, and other factors were considered in calculating the channel construction cost estimate. The calculated cost range is minus $850,000 to plus $210,000 relative to the single value estimate used for this item. Converting this range to equivalent annual dollars yields minus $85,000 to plus $21,000 per year.

The above uncertainty spreads were integrated with the single value estimates for existing annual damages, with project damages and project costs. With the aid of "At Risk" computer software, probability ranges were calculated. See Risk Analysis calculations in Economics Appendix H. The calculated probability distributions for project cost, benefits, net benefits, and benefit-to-cost ratio are illustrated in Figures 18 through 21.

The calculated expected values generated as compared to the single value estimates were determined as follows:

(EQUIVALENT ANNUAL)	SINGLE VALUE ESTIMATE	CALCULATED EXPECTED VALUE
PROJECT BENEFITS	$558,000	$376,000
PROJECT COSTS	$480,000	$464,000
NET BENEFITS	$ 78,000	($88,000)
BENEFIT/COST RATIO	1.16	0.81
PROBABILITY OF PRJECT NET POSITIVE BENEFITS	N/A	29%

These results show a substantial decrease in project benefits. This decrease was due primarily to the high sensitivity of both calculated existing and with project damages given a flood stage frequency or structure elevation variance of plus or minus 0.5 feet. This high sensitivity was not surprising given the relatively flat floodplain area. These results do not, however, appear indicative of the actual flooding situation in this watershed. Survey verification of structure elevations and actual flood damage data obtained in three recent floods indicate that the single value estimate has a high degree of confidence.

Figure 18
Bayou Fountain
Probability Distribution

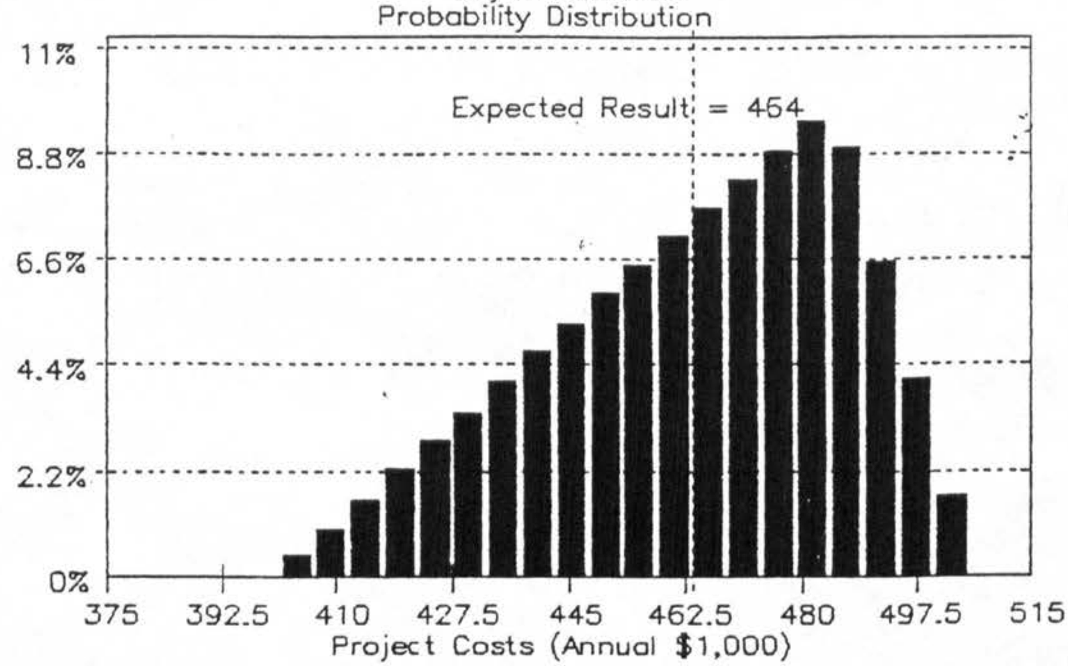


Figure 19
Bayou Fountain
Probability Distribution

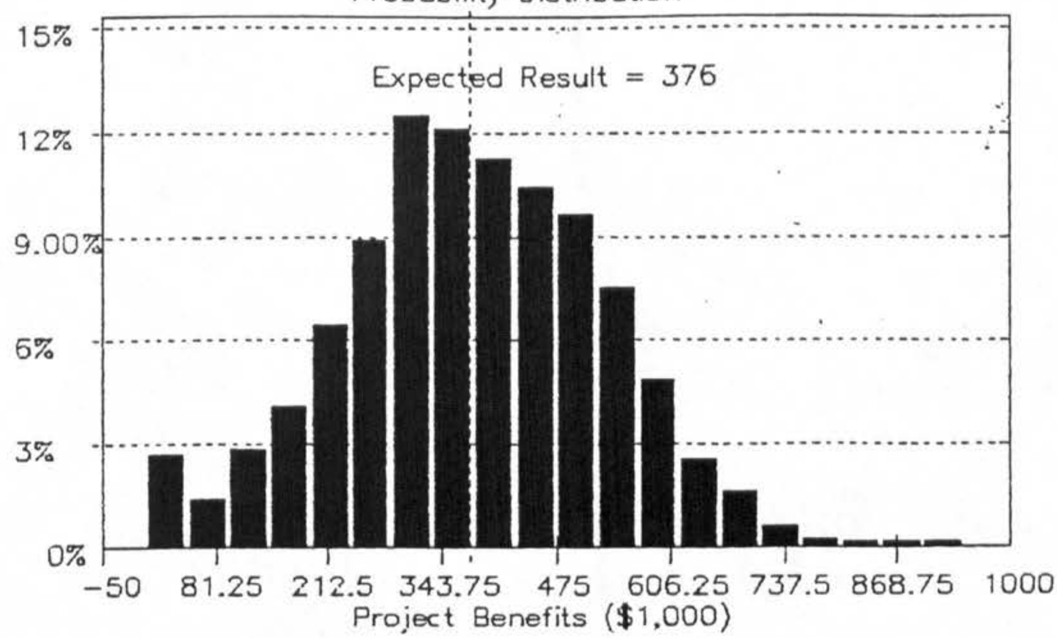


Figure 20
Bayou Fountain
Probability Distribution

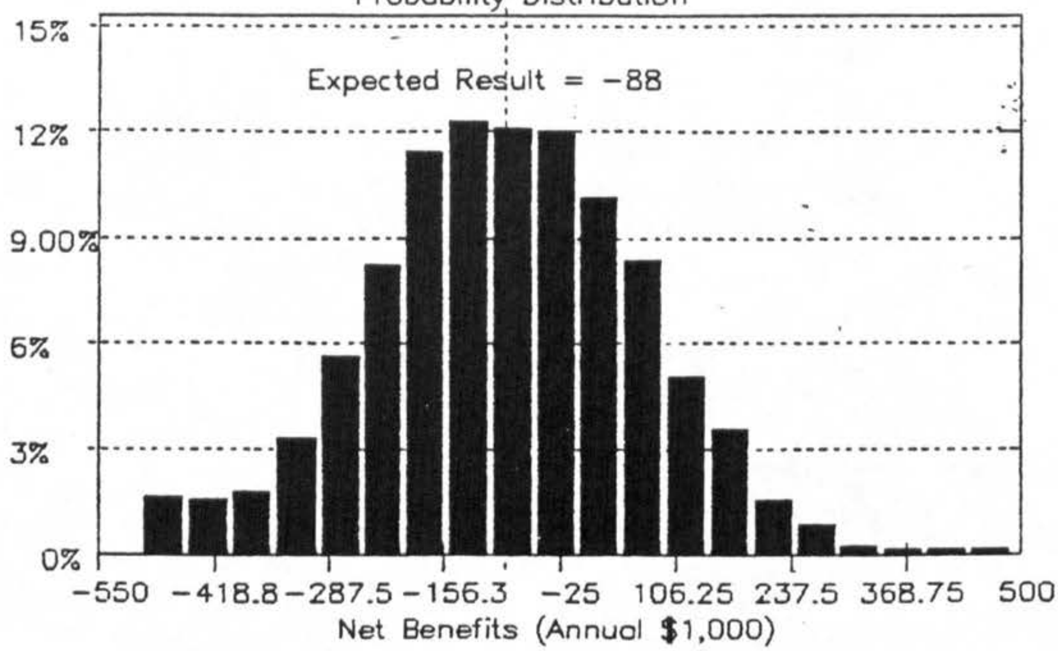
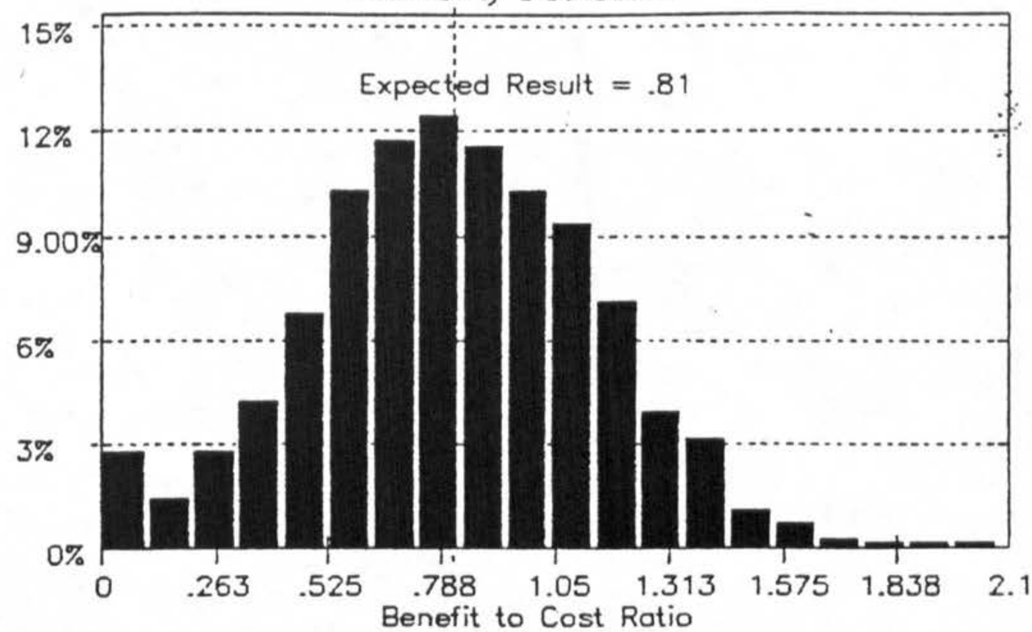


Figure 21
Bayou Fountain
Probability Distribution



MITIGATION PLAN

It was determined that combining the mitigation needs of the five tentatively selected plans and developing an integrated mitigation plan was far more practical than developing a separate plan for each. Significant cost savings can be realized by acquiring and developing a minimum number of sites with their total combined acreage mitigating combined needs as opposed to acquiring and developing five sites with specific acreage in accordance with each tentatively selected plan.

The mitigation plan recommended consists of acquisition and development of bottomland hardwood habitat upon 397 acres of land in East Baton Rouge Parish. This would be made up of the combined 282 acres of land located at a site in the northern part of the parish off Joor Road and 115 acres of land at a site in the southern part of the parish adjacent to a BREC park site in the Bayou Fountain area. See Plates 52 and 53. Locating mitigation sites in the metropolitan area and adjacent to these public parks will provide the opportunity for some public interaction and enjoyment of the areas. Such interaction can be accomplished by means of suitably designed nature trails. Alternative sites may be used given the availability of the above sites and/or other site opportunities. The estimated first cost of the combined mitigation plan is $2,072,000. Annual operation, maintenance, and replacement costs are estimated at $22,000 per year.

An alternate mitigation plan was developed utilizing existing forested areas along Bayou Duplantier in the Ward Creek watershed. This plan calls for the preservation and maintenance, as well as reforesting of 115 acres of all available existing forest along Bayou Duplantier in combination with reforestation of 153 acres of existing open land along Joor Road. This plan requires a larger land purchase since more acres of "existing" forest are needed versus replanting open land to achieve mitigation needs. Also, land prices in the Bayou Duplantier area were determined to be significantly higher than the other proposed mitigation sites. The combination of the above makes this plan approximately $2.5 million more expensive than the base plan above. This alternate plan, while suitable, was therefore not recommended.

Local interests have expressed a desire to preserve the Bayou Duplantier area as part of a nature park, of which this mitigation area can be an integral part. Should the local sponsor decide to use this area for project mitigation purposes, it will be acceptable. The local sponsor would, however, bear the full excess cost difference of $3 million.

Operation and maintenance would be the responsibility of the local sponsor. The Recreation and Parks Commission for the Parish of East Baton Rouge has indicated a definite interest in and willingness to assume responsibility of the day to day operation and maintenance of the areas. This organization would be a logical operator of the facilities. Maintenance includes continuous protection of the land and plantings.

Hazardous, Toxic, and Radioactive Waste (HTRW)

Through visual site survey, record review at various agencies, and discussions with knowledgeable personnel, significant sites were identified as possible or probable sources of HTRW contamination. Individual sampling plans will be developed, depending upon the suspected contaminant(s), to determine the nature and extent of contamination (see Appendix D for further detail). The local sponsor will bear the full cost and responsibility for remediation of any confirmed waste contaminated sites.

Clean Water Act. A Section 404(b)(1) Evaluation has been prepared for the portions of each of the watersheds of the overall project for which materials would be deposited into waters of the United States. Project compliance with Section 404(r) requirements has been achieved, however, the District will pursue State of Louisiana Water Quality Certification, Section 401, instead. Application has been made to the Louisiana Department of Environmental Quality for certification of the Tentatively Selected Plan for each of the watersheds.

PLAN IMPLEMENTATION

GENERAL

The purpose of this section is to present pertinent information concerning the Federal and non-Federal responsibilities regarding cost apportionment and the diversion of responsibilities for construction and subsequent operation, maintenance, and rehabilitation of the project. Such cost apportionment is based on Federal legislature and administrative policies. No institutional changes are necessary for plan implementation.

SUMMARY

A descriptive summary of each element of the Tentatively Selected Plan is shown in Table 95.

TABLE 95

TENTATIVELY SELECTED PLAN SUMMARY
(1994$)

ELEMENT DESCRIPTION	FIRST COST	ANNUAL O&M COSTS	TOTAL EQUIVALENT UNIFORM ANNUAL (includes interest lost during construction)	CALCULATED TOTAL EQUIVALENT ANNUAL BENEFITS	BENEFIT TO COST RATIO
BLACKWATER BAYOU	$21,690,000	$64,000	$2,149,000	$4,037,000	1.88
Earthen channel enlargement of the main stem of Blackwater Bayou (above Frenchtown Road) and its main tributary; design to contain 10-year storm event within bank; 13 miles total project length					
BEAVER BAYOU	$20,590,000	$64,000	$2,034,000	$8,779,000	4.32
Earthen channel enlargement of the main stem of Beaver Bayou; design to contain 25-year storm event within bank; 8 miles total project length					
JONES CREEK	$52,590,000	$67,000	$5,334,000	$9,899,000	1.86
Concrete lining of the main stem of Jones Creek (above Jones Creek Road) and its three main tributaries - Weiner Creek, and Lively Bayou; minimal channel clearing and snagging of the main stem of Jones Creek below Jones Creek Road; design to contain 50-year storm event within bank; 19 miles total project length; includes an 11-mile bike path recreation feature					

TABLE 95 (CONTINUED)

TENTATIVELY SELECTED PLAN SUMMARY
(1994$)

ELEMENT DESCRIPTION	FIRST COST	ANNUAL O&M COSTS	TOTAL EQUIVALENT UNIFORM ANNUAL (includes interest lost during construction)	CALCULATED TOTAL EQUIVALENT ANNUAL BENEFITS	BENEFIT TO COST RATIO
WARD CREEK	$9,470,000	$76,000	$924,000	$1,085,000	1.17
Minimal channel clearing and snagging of the main stem of Ward Creek up to Corporate Blvd.; minimal clearing and snagging of Dawson Creek up to Bayou Duplantier; concrete lining of North Branch Tributary up to Interstate 12; 14 miles total project total project length; designed to contain 10-year storm event within bank (25-year event on North Branch Tributary)					
BAYOU FOUNTAIN	$4,760,000	$37,000	$480,000	$ 558,000	1.16
Earthen channel enlargement of Bayou Fountain between Siegen Lane and Gardere Lane; minimal channel clearing and snagging below Siegen Lane and above Gardere Lane up to Ben Hur Rd.; designed to contain 10-year storm event within bank; 11 miles total project length					
COMBINED HABITAT MITIGATION	($2,072,000)	($22,000)	N/A	N/A	N/A
Acquisition and development of bottomland hardwood habitat on 440 total acres of land on four sites in East Baton Rouge Parish	(Mitigation costs included in the above elements)				
TOTAL PROJECT COSTS	$109,100,000	$308,000	$10,921,000	$24,358,000	2.23

SOURCE: U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT

DIVISION OF PLAN RESPONSIBILITIES

FEDERAL RESPONSIBILITIES

The Federal government will be responsible for planning, engineering, design, and construction of the project in accordance with the applicable provisions of Public Law 99-662 (WRDA of 1986).

NON-FEDERAL RESPONSIBILITIES

a. Provide all lands, easements, rights-of-way, excavated material disposal areas, as may be determined by the Government to be necessary for construction, operation, and maintenance of all features of the project;

b. Accomplish at no cost to the Government all relocations and removal of (excluding railroad bridges and approaches thereto) including pipelines, cables, and other facilities including drainage facilities required by the construction of the project, and alterations of buildings determined by the Government to be necessary for construction of the project;

c. Provide during the period of construction a cash contribution equal to 5 percent of total flood control project cost;

d. Provide such additional amount necessary so that the total contribution of non-Federal interest for structural flood control features of the project is not less than 25 percent of the cost of the project assigned to structural flood control;

e. Provide during the period of construction a cash contribution equal to 50 percent of the total cost of the recreation features;

f. Hold and save the United States free from damages due to the construction, operation, maintenance, and rehabilitation of the project, except where such damages are due to the fault or negligence of the United States or its contractors;

g. Assume responsibility for any legal liabilities resulting from transfer of water from one watershed to another;

h. Assume responsibility for operating, maintaining, replacing, repairing, and rehabilitating the project or completed elements thereof including mitigation and recreation features without cost to the Government, in accordance with regulations prescribed by the Secretary of the Army;

i. No less than once each year inform affected interests of the limitations of the protection afforded by the project;

j. Participate in and comply with applicable Federal floodplain management and flood insurance programs;

k. Publicize floodplain information in the area concerned and shall provide this information to zoning and other regulatory agencies for their guidance and leadership in preventing unwise future development in the floodplain and in adopting such regulations as may be necessary to prevent unwise future development and to ensure compatibility with protection levels provided by the project;

l. Implement and enforce existing and required supplemental flood damage prevention ordinances in the Bayou Fountain watershed;

m. Exact ordinances and promulgate regulations prior to initiation of construction to prevent construction and encroachment on the proposed project works that would reduce their flood-carrying capacity or hinder maintenance and operation, and control development in the project area to prevent an undue increase in the flood damage potential;

n. Comply with the applicable provisions of the Uniform Relocations Assistance and Real Property Acquisition Policies Act of 1970, PL 91-646, approved January 2, 1971, in acquiring lands, easements, and rights-of-way for construction and subsequent operation and maintenance of the project, and inform all affected persons of applicable benefits, policies, and procedures in connection with said Act;

o. Assume complete responsibility for the clean up of any hazardous material located on project lands and regulated under Federal, state, and/or local laws or ordinances including the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and responsibility for operating, maintaining, replacing, repairing, and rehabilitating the project in a manner so that liability will not arise under CERCLA or other Federal, state, and/or local guidelines;

p. Comply with Section 601 of Title VI of the Civil Rights Act of 1964 (PL 88-352) that no person shall be excluded from participation in, denied the benefits of, or subjected to discrimination in connection with the project on the grounds of race, creed, or national origin;

q. Comply with Section 221 of PL 91-611, Flood Control Act of 1970, approved December 31, 1970, which provides that the construction of any water resource project by the Corps of Engineers shall not be started until the local sponsor has entered into a written agreement to furnish its required cooperation for the project;

r. Assure that construction and maintenance of any non-Federal flood control features do not diminish the flood protection provided by the authorized project plan.

Construction Cost-Sharing Requirements

This project will be funded under terms of a single project Cooperation Agreement (PCA) with five separable elements, namely, the proposed projects for each of the five watersheds. Although the watersheds will be treated as separable elements, the overall plan is a comprehensive one for the study area. Cost-sharing will therefore be based on the overall plan; i.e., local sponsor credits in excess of the minimum on one watershed will be applied toward the minimum requirements of other watersheds. In accordance with Public Law 99-662 (Water Resources Development Act), November 1986, the local sponsor is responsible for providing 5 percent cash minimum plus all lands, rights-of-way, easements, relocations, and disposal areas; all of which must total at least 25 percent, but not more than 50 percent, of the total project

cost, less recreation features. Recreation features will be cost-shared independently on a 50-50 basis.

Based on the above, local sponsor cost-sharing requirements were determined for the project. This cost breakdown, by feature and in 1994 dollars, is shown in Table 96 (incremental estimate). Overall, the total project cost is estimated at $109,100,000 with a Federal share of 75% or $81,500,000 and a non-Federal share of 25% or $27,600,000.

Construction Schedule

Due to the overall project size, construction will be phased. Watershed project schedule order was determined in consideration of the potential local sponsor's preference. Project construction schedules are shown in Table 97. In accordance with this schedule is the acquisition and development of mitigation sites which will be combined for all the projects. The proposed mitigation site acquisition and development schedule is shown in Table 98. Overall, the project construction will take 9 years and begin with land acquisition on Bayou Fountain in Fiscal Year 1997 and finish with completion of the fourth segment of the Jones Creek watershed in Fiscal Year 2005.

TABLE 96

TENTATIVELY SELECTED PLAN

Incremental Federal and Non-Federal Costs (X$1,000)

Feature		Total Cost		Federal Cost		Local Sponsor Cost	
01 Lands and Damages	$	5,660	$	93	$	5,567	
02 Relocations	$	4,204	$	0	$	4,204	
06 Fish and Wildlife Facilities	$	232	$	232	$	0	
09 Channels and Canals	$	83,756	$	66,558	$	17,198	1/
14 Recreation Facilities	$	1,136	$	568	$	568	2/
29 Project Cooperation Agreements	$	20	$	20	$	0	
30 Planning, Engineering and Design	$	8,436	$	8,373	$	63	3/
31 Construction Management	$	5,656	$	5,656	$	0	
Project Total	$	109,100	$	81,500	$	27,600	
						25.30%	

Non-Federal Cash:		
Recreation (50% of Total)	$	568
Other (5% of Project W/O Recreation)	$	5,398
Additional Cash Required to Meet (Min) 25% Non-Fed Share	$	11,863
Total Non-Federal Cash	$	17,829
Non-Federal LERRD's:		
Lands, Easements, Rights-of-Way & Disposal Areas	$	5,567
Relocations	$	4,204
Total Non-Federal LERRD's	$	9,771

1/ Non-Federal cash from 5% minimum cash, plus additional cash requirement, scheduled in 09 Feature

2/ Non-Federal 50% of Recreation Facilities must be cash

3/ First year (FY97) Non-Federal cash received after execution of PCA scheduled in 30 Feature.

TABLE 97

TENTATIVELY SELECTED PLAN
PROPOSED CONSTRUCTION SCHEDULES

WATERSHED (CONTRACT-ITEM)	FY *START	FY COMPLETE
BAYOU FOUNTAIN (ALL)	1997	1999
WARD CREEK (ALL)	1999	2002
JONES CREEK		
(1 - LOWER JONES CREEK)	1999	2002
(2 - UPPER JONES CREEK)	2002	2004
(3 - LIVELY BAYOU AND TRIBUTARY)	2003	2004
(4 - WEINER CREEK)	2004	2005
BEAVER BAYOU (ALL)	2000	2003
BLACKWATER BAYOU (ALL)	2001	2004

* CONSTRUCTION PERIOD STARTS WITH LAND ACQUISITION

SOURCE: U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT

Construction Funding Requirements

In accordance with the above construction cost-sharing and phased schedule, project required yearly construction costs, in 1993 dollars, are shown by year in Table 99 (incremental estimate). Applying anticipated annual inflation rates to these figures, inflated project construction costs are shown by year in Table 100 (fully-funded estimate). This fully-funded estimate is broken down by Federal and non-Federal cost share in Table 101. Overall, the total project cost, in inflated dollars, is estimated at $143,000,000 with a Federal share of 75% or $107,000,000 and a non-Federal share of 25% or $36,000,000.

Operation and Maintenance Funding Requirements

As stated above, the local sponsor must bear the entire project annual operation and maintenance costs. Included is all necessary repair, replacement, and rehabilitation of all project elements and features. In 1993, East Baton Rouge Parish spent about $7,500,000 for operation and maintenance for the drainage system parish-wide. Construction of proposed channel modifications, recreation items, and mitigation site developments will require additional operation and maintenance funding. Table 102 lists required operation and maintenance dollars for each watershed including recreational items, and, the combined mitigation sites. The total additional system annual operation and maintenance cost is estimated to be $308,000 per year in 1994 dollars. This operation and maintenance amount will not be fully needed until all projects are completed. For all practical purposes, this additional operation and maintenance would be uniformally phased in the beginning from close to the end of the first construction phase to the end of the last. Table 103 illustrates this phase-in of additional operation and maintenance costs and shows estimated fully-funded (cost-inflated) values.

TABLE 98

MITIGATION SITE ACQUISITION AND DEVELOPMENT SCHEDULE

SITE LOCATION	ACRES	ACQUISITION AND DEVELOPMENT START DATE
Burbank Drive	115	2nd Half 2000
Joor Road	282	1st Half 2001

Source: U.S. Army Corps of Engineers, New Orleans District

TABLE 99

TENTATIVELY SELECTED PLAN - COST SCHEDULE (INCREMENTAL)

FEATURE	Costs by Fiscal Year (X$1,000)											
	FY 95	FY 96	FY 97	FY 98	FY 99	FY 00	FY 01	FY 02	FY 03	FY 04	FY 05	TOTAL
01 LANDS	0	0	557	638	126	48	1,478	2,813	0	0	0	5,660
NON-FEDERAL	0	0	550	630	91	39	1,466	2,791	0	0	0	5,567
FEDERAL	0	0	7	8	35	9	12	22	0	0	0	93
02 RELOCATIONS	0	0	0	4	0	0	1,228	2,099	873	0	0	4,204
06 FISH & WILDLIFE FACILITIES	0	0	0	0	0	0	0	0	232	0	0	232
09 CHANNELS & CANALS	0	0	0	1,060	1,099	1,339	8,147	12,636	22,920	26,872	9,683	83,756
14 RECREATION FACILITIES	0	0	0	0	0	0	0	284	284	284	284	1,136
29 PROJ COOPERATION AGRMNT	0	0	0	5	0	2	13	0	0	0	0	20
30 PLAN, ENGR & DESIGN	742	734	960	985	1,334	1,202	1,020	762	422	190	85	8,436
31 CONST MANAGEMENT	0	0	0	180	185	150	698	897	1,423	1,425	698	5,656
TOTAL PROJECT	742	734	1,517	2,872	2,744	2,741	12,584	19,491	26,154	28,771	10,750	109,100
TOTAL PROJECT WITHOUT RECREATION	742	734	1,517	2,872	2,744	2,741	12,584	19,207	25,870	28,487	10,466	107,964
(5% cash and 25% minimum Non-Federal contribution are based on Total Project, excluding Recreation. Recreation is cost-shared 50%-50%.												
CONSTRUCTION SCHEDULE (% BY YEAR)			3%	2%	3%	3%	10%	15%	25%	29%	11%	100%
("Construction" for this purpose is everything but Non-Federal LERRD's and all Recreation. Percent is % of Total and represents rate at which Non-Federal cash is paid. Non-Federal cash is not due until Project Cooperation Agreement is signed.)												

TABLE 99 (Continued)

TENTATIVELY SELECTED PLAN - COST SCHEDULE (INCREMENTAL)

Cost Breakdowns	Costs by Fiscal Year (X$1,000)											
	FY 95	FY 96	FY 97	FY 98	FY 99	FY 00	FY 01	FY 02	FY 03	FY 04	FY 05	TOTAL
FEDERAL COSTS												
Construction	742	734	769	2,114	2,098	2,055	9,345	13,529	20,358	21,351	7,837	80,932
(Federal construction includes everything but Non-Fed LERRDS, Non-Fed cash and all Recreation.)												
50% of Recreation	0	0	0	0	0	0	0	142	142	142	142	568
Total Federal Cost	742	734	769	2,114	2,098	2,055	9,345	13,671	20,500	21,493	7,979	81,500
NON-FEDERAL COSTS	*Adjustments to achieve rounded Non-Federal & Federal costs were made in the Non-Federal Additional Cash Requirements.*											
LERRD's	0	0	550	634	91	39	2,694	4,890	873	0	0	9,771
(Non-Federal LERRD's are Lands, Easements, Rights-of-Way, Relocations, and Disposal areas required for project construction and mitigation.)												
50% of Recreation	0	0	0	0	0	0	0	142	142	142	142	568
5% Minimum Cash Contribution	0	0	135	124	146	151	545	788	1,371	1,560	578	5,398
Non-Fed cash based on 5% of Total Project, excluding Recreation, and paid at the rate of Construction Schedule (see first page of table).												
Additional Cash for 25% Min.												
25% X Cum. Proj. W/O Rec.			748	1,466	2,152	2,838	5,984	10,785	17,253	24,375	26,991	
Less Cumulative LERRD's			(550)	(1,184)	(1,275)	(1,314)	(4,008)	(8,898)	(9,771)	(9,771)	(9,771)	
Less Cumulative 5% Cash			(135)	(259)	(405)	(556)	(1,101)	(1,889)	(3,260)	(4,820)	(5,398)	
Less additional cash paid				(63)	(63)	(472)	(968)	(968)	(968)	(4,236)	(9,812)	
Subtotal			63	(40)	409	496	(93)	(970)	3,254	5,548	2,010	
Actual cash owed/paid			63	0	409	496	0	0	3,268	5,576	2,051	11,863
									(adjustments made for rounding)			
Non-Fed cash each year based on 25% of cumulative Total Project, excluding cumulative Recreation, less cumulative LERRD's, less cumulative 5% cash, and less any additional cash paid to date. It is paid at the rate to maintain a minimum Non-Federal cost-share of 25% each year. Negative values ( ) represent excess credit above the 25% minimum, and negative subtotals represent years in which Local Sponsor will owe no additional cash.												
Total Non-Federal Cash	0	0	198	124	555	647	545	930	4,781	7,278	2,771	17,829
Total Non-Federal Cost	0	0	748	758	646	686	3,239	5,820	5,654	7,278	2,771	27,600
Non-Federal % By Year			25.0%	25.7%	25.0%	25.0%	25.4%	27.4%	25.2%	25.2%	25.3%	

TABLE 100

TENTATIVELY SELECTED PLAN - COST SCHEDULE (FULLY-FUNDED)

FEATURE	Costs by Fiscal Year (X$1,000)											
	FY 95	FY 96	FY 97	FY 98	FY 99	FY 00	FY 01	FY 02	FY 03	FY 04	FY 05	TOTAL
01 LANDS	0	0	631	754	153	61	1,935	3,796	0	0	0	7,330
NON-FEDERAL	0	0	623	745	112	50	1,920	3,768	0	0	0	7,218
FEDERAL	0	0	8	9	41	11	15	28	0	0	0	112
02 RELOCATIONS	0	0	0	5	0	0	1,517	2,672	1,145	0	0	5,339
06 FISH & WILDLIFE FACILITIES	0	0	0	0	0	0	0	0	304	0	0	304
09 CHANNELS & CANALS	0	0	0	1,195	1,277	1,604	10,078	16,112	30,119	36,417	13,530	110,332
								(these numbers contain project rounding)				
14 RECREATION FACILITIES	0	0	0	0	0	0	0	362	373	384	396	1,515
29 PROJ COOPERATION AGRMNT	0	0	0	6	0	3	17	0	0	0	0	26
30 PLAN, ENGR & DESIGN	774	797	1,088	1,164	1,642	1,527	1,336	1,029	587	272	126	10,342
31 CONST MANAGEMENT	0	0	0	213	228	191	914	1,211	1,981	2,043	1,031	7,812
TOTAL PROJECT	774	797	1,719	3,337	3,300	3,386	15,797	25,182	34,509	39,116	15,083	143,000
TOTAL PROJECT WITHOUT RECREATION	774	797	1,719	3,337	3,300	3,386	15,797	24,820	34,136	38,732	14,687	141,485
(5% cash and 25% minimum Non-Federal contribution are based on Total Project, excluding Recreation. Recreation is cost-shared 50%-50%.												
CONSTRUCTION SCHEDULE (% BY YEAR)			2%	2%	3%	3%	10%	14%	26%	30%	11%	100%
("Construction" for this purpose is everything but Non-Federal LERRD's and all Recreation. Percent is % of Total and represents rate at which Non-Federal cash is paid. Non-Federal cash is not due until Project Cooperation Agreement is signed.)												

TABLE 100 (Continued)

TENTATIVELY SELECTED PLAN - COST SCHEDULE (FULLY-FUNDED)

Cost Breakdowns	Costs by Fiscal Year (X$1,000)											
	FY 95	FY 96	FY 97	FY 98	FY 99	FY 00	FY 01	FY 02	FY 03	FY 04	FY 05	TOTAL
FEDERAL COSTS												
Construction	774	797	896	2,446	2,532	2,540	11,681	17,368	27,051	29,116	11,041	106,242
(Federal construction includes everything but Non-Fed LERRDS, Non-Fed cash and all Recreation.)												
50% of Recreation	0	0	0	0	0	0	0	181	187	192	198	758
Total Federal Cost	774	797	896	2,446	2,532	2,540	11,681	17,549	27,238	29,308	11,239	107,000
NON-FEDERAL COSTS	*Adjustments to achieve rounded Non-Federal & Federal costs were made in the Non-Federal Additional Cash Requirements.*											
LERRD's	0	0	623	750	112	50	3,437	6,440	1,145	0	0	12,557
(Non-Federal LERRD's are Lands, Easements, Rights-of-Way, Relocations, and Disposal areas required for project construction and mitigation.)												
50% of Recreation	0	0	0	0	0	0	0	181	186	192	198	757
5% Minimum Cash Contribution	0	0	149	141	177	184	679	1,012	1,804	2,115	806	7,067
Non-Fed cash based on 5% of Total Project, excluding Recreation, and paid at the rate of Construction Schedule (see first page of table).												
Additional Cash for 25% Min.												
25% X Cum. Proj. W/O Rec.			823	1,657	2,482	3,328	7,278	13,483	22,017	31,700	35,371	
Less Cumulative LERRD's			(623)	(1,373)	(1,485)	(1,535)	(4,972)	(11,412)	(12,557)	(12,557)	(12,557)	
Less Cumulative 5% Cash			(149)	(290)	(467)	(651)	(1,330)	(2,342)	(4,146)	(6,261)	(7,067)	
Less additional cash paid				(51)	(51)	(530)	(1,142)	(1,142)	(1,142)	(5,278)	(12,779)	
			-----------	-----------	-----------	-----------	-----------	-----------	-----------	-----------	-----------	
Subtotal			51	(57)	479	612	(166)	(1,413)	4,172	7,604	2,968	
Actual cash owed/paid			51	0	479	612	0	0	4,136	7,501	2,840	15,619
									(cash reduced for rounding)			
Non-Fed cash each year based on 25% of cumulative Total Project, excluding cumulative Recreation, less cumulative LERRD's, less cumulative 5% cash, and less any additional cash paid to date. It is paid at the rate to maintain a minimum Non-Federal cost-share of 25% each year. Negative values ( ) represent excess credit above the 25% minimum, and negative subtotals represent years in which Local Sponsor will owe no additional cash.												
Total Non-Federal Cash	0	0	200	141	656	796	679	1,193	6,126	9,808	3,844	23,443
Total Non-Federal Cost	0	0	823	891	768	846	4,116	7,633	7,271	9,808	3,844	36,000
Non-Federal % By Year			25.0%	25.9%	25.0%	25.0%	25.6%	27.8%	25.2%	25.1%	25.2%	

TABLE 101

TENTATIVELY SELECTED PLAN

Fully-Funded Federal and Non-Federal Costs (X$1,000)

Feature	Total Cost	Federal Cost	Local Sponsor Cost
01 Lands and Damages	$ 7,330	$ 112	$ 7,218
02 Relocations	$ 5,339	$ 0	$ 5,339
06 Fish and Wildlife Facilities	$ 304	$ 304	$ 0
09 Channels and Canals	$ 110,332	$ 87,697	$ 22,635
14 Recreation Facilities	$ 1,515	$ 758	$ 757
29 Project Cooperation Agreements	$ 26	$ 26	$ 0
30 Planning, Engineering and Design	$ 10,342	$ 10,291	$ 51
31 Construction Management	$ 7,812	$ 7,812	$ 0
Project Total	$ 143,000	$ 107,000	$ 36,000 25.17%

Non-Federal Cash:	
Recreation (50% of Total)	$ 757
Other (5% of Project W/O Recreation)	$ 7,067
Additional Cash Required to Meet (Min) 25% Non-Fed Share	$ 15,619
Total Non-Federal Cash	$ 23,443
Non-Federal LERRD's:	
Lands, Easements, Rights-of-Way & Disposal Areas	$ 7,218
Relocations	$ 5,339
Total Non-Federal LERRD's	$ 12,557

1/ Non-Federal cash from 5% minimum cash, plus additional cash requirement, scheduled in Featur

2/ Non-Federal 50% of Recreation Facilities must be cash

3/ First year (FY97) Non-Federal cash received after execution of PCA scheduled in 30 Feature.

TABLE 102

REQUIRE PROJECT ANNUAL OPERATION, MAINTENANCE*, AND EQUIVALENT ANNUAL REPLACEMENT COSTS (1994 $)

WATERSHED	CHANNELS	**MITIGATION SITES	RECREATION ITEMS	TOTAL
BAYOU FOUNTAIN	$ 36,000	$ 1,000	$ 0	$ 37,000
WARD CREEK	$ 74,000	$ 2,000	$ 0	$ 76,000
JONES CREEK	$ 27,000	$ 6,000	$34,000	$ 67,000
BEAVER BAYOU	$ 57,000	$ 7,000	$ 0	$ 64,000
BLACKWATER BAYOU	$ 58,000	$ 6,000	$	$ 64,000
TOTAL PROJECT	$252,000	$22,000	$34,000	$308,000

** PRORATED COSTS OF COMBINED MITIGATION PLAN

SOURCE: U.S. ARMY CORPS OF ENGINEER, NEW ORLEANS DISTRICT

TABLE 103
TOTAL SYSTEM OPERATIONS AND MAINTENANCE* COST INCREASE FOR PROPOSED PROJECT

(1,000's)

YEAR	1998	1999	2000	2001	2002	2003	2004	2005	2006
1994 $	$35	$67	$102	$137	$170	$205	$239	$273	$308
FULLY FUNDED $ (INFLATED)	$42	$84	$130	$180	$232	$288	$348	$411	$479

Includes all operation and maintenance for channels, mitigation areas, bike paths, and new trees. Operation and maintenance requirements continue beyond 2006 at $308,000 (1994 $).

* Includes all repair, replacement, and rehabilitation of all project elements and features.

Source: U.S. Army Corps of Engineers, New Orleans District

Preliminary Capability Statement

The City of Baton Rouge, Parish of East Baton Rouge, is the potential local sponsor for the recommended plan. The

Department of Public Works will likely manage and maintain the channels and proposed bike path. The Recreation and Park Commission (BREC) will likely manage and maintain the proposed mitigation sites. See letters of intent, Exhibit 1. East Baton Rouge Parish proposes to finance their share of the project by means of either an ad valorem tax or sales tax, with or possibly without the sale of bonds. Their preferred plan is to utilize a sales tax without a bond issue. Their complete financing plan can be found in the Economics Appendix H.

This project does not qualify for a revision to the non-Federal cost-share for flood control based on estimated flood control benefits and costs and on application of guidelines published on flood control cost-sharing requirements under the Ability to Pay Provision; interim fund rule (Vol. 52, Federal Register Pages 35872-35892, 1989 to be codified at (33 CFR Sections 241.1-.6)), implementing Section 103(m) of the Water Resources Development Act of 1986.

SUMMARY OF COORDINATION, PUBLIC VIEWS, AND COMMENTS

The initial public meeting on the Amite River and Tributaries Study was held on October 30, 1984. At that meeting local interests expressed their views on alternative plans that were identified as being potentially feasible and should be studied in further detail.

Between 1984 and 1994, numerous meetings were held with representatives of Federal, state, and local agencies. The meetings provided forums to discuss the status and direction of the study. Very close coordination through telephone conversations and meetings was maintained with study locals and the potential project sponsor, East Baton Rouge Parish, Department of Public Works. Among the meetings that the Corps has participated in on this study include meetings with the Mayor of Baton Rouge, Metro Council Members of Baton Rouge, state legislators, City of Baton Rouge Chamber of Commerce, Amite River Basin Drainage and Conservation Commission, U.S. Fish and Wildlife Service, Louisiana Wildlife and Fisheries, East Baton Rouge Parish Department of Public Works, Recreation and Park Commission for the Parish of East Baton Rouge, Department of Natural Resources, Department of Environmental

Quality, Department of Transportation and Development, and Louisiana State University.

Dates of recent major meetings are listed below.

FEDERAL/STATE/LOCAL AGENCY/INTERESTED GROUP	DATE
STATUS MEETING City of Baton Rouge Chamber of Commerce	May 1992
STATUS MEETING U.S. Senator J. Bennett Johnston Louisiana State Area Legislators Louisiana Department of Transportation and Development (DOTD) Amite River Basin Drainage and Conservation Commission (ARBDCC)	June 1992
MITIGATION AREA SELECTION MEETING East Baton Rouge Parish Department of Public Works (EBRDPW) Recreation and Park Commission of East Baton Rouge Parish Louisiana State University U.S. Fish and Wildlife Service	February 4, 1993
STATUS MEETING Baton Rouge Metro Council	March 10, 1993
COST-SHARING MEETING WITH POTENTIAL LOCAL SPONSOR Mayor of the City of Baton Rouge EBRDPW Louisiana DOTD	March 12, 1993
STATUS MEETING Citizens of Baton Rouge Council District 3	March 30, 1993
STATUS MEETING Citizens of Baton Rouge Council District 3	June 10, 1993

COST-SHARING MEETING WITH POTENTIAL LOCAL SPONSOR Mayor of the City of Baton Rouge EBRDPW Louisiana DOTD	August 20, 1993
COST-SHARING MEETING WITH LOCAL SPONSOR Mayor of the City of Baton Rouge EBRDPW	August 14, 1993
COST-SHARING MEETING WITH LOCAL SPONSOR Mayor of the City of Baton Rouge Baton Rouge Metro Council EBRDPW	September 1, 1993
STATUS MEETING Citizens of Baton Rouge Council District 1	September 7, 1993
STATUS MEETING Citizens of Baton Rouge Council District 12	September 14, 1993
FEASIBILITY REVIEW CONFERENCE EBRDPW Louisiana DOTD U.S. Fish and Wildlife Service Louisiana Department of Wildlife and Fisheries Louisiana Department of Natural Resources	December 12, 1993 December 13, 1993
STATUS MEETING EBRDPW Mayor of the City of Baton Rouge Louisiana DOTD	April 12, 1994
STATUS MEETING EBRDPW Mayor of the City of Baton Rouge Louisiana State Area Legislators	April 15, 1994
STATUS MEETING EBRDPW Louisiana DOTD	July 25, 1994
STATUS MEETING EBRDPW Citizens of Baton Rouge Council District 3 Louisiana State University	September 13, 1994

STATUS MEETING EBRDPW Citizens of Baton Rouge Council District 3	October 8, 1994
STATUS MEETING EBRDPW Citizens of Baton Rouge Council District 12	October 11, 1994
STATUS MEETING EBRDPW Federation of Civic Associations	October 13, 1994

The Amite River Basin Drainage and Conservation Commission was created by Act 896 of the 1981 Louisiana regular legislative session. The Commission is empowered by the State of Louisiana to incur debt, issue bonds to secure funds, and expropriate lands to accommodate water resources projects. The Commission has had approximately 80 meetings since its creation in 1981. The Corps of Engineers has attended most every meeting and discussed study status and study results.

The potential project local sponsor, East Baton Rouge Parish, Department of Public Works (EBRDPW), has been actively involved in the study. Numerous meetings, correspondence, and phone conversations have taken place with EBRDPW. They have contributed greatly in plan formulation and the development of accurate project cost estimates. EBRDPW has reviewed the preliminary draft cost-sharing agreement and has provided the Corps with a letter of intent indicating that the agency understands the responsibilities that are incumbent on the local sponsor and the agency intends to enter into a binding agreement with the Corps of Engineers at the appropriate time. Their letter of intent along with a resolution from the Metropolitan Council of the Parish of East Baton Rouge and the City of Baton Rouge, and, a letter of intent from the Recreation and Park Commission for the Parish of East Baton Rouge are contained in Exhibit 1.

EXHIBIT 1

Office of the Mayor-President

City of Baton Rouge
Parish of East Baton Rouge

222 St. Louis Street
Post Office Box 1471
Baton Rouge, Louisiana
70821

504/389-3100

TOM ED McHUGH
Mayor-President

September 14, 1993

Colonel Michael Diffley
District Engineer
U.S. Army Corps of Engineers
Attention: CELMN-PD
P.O. Box 60267
New Orleans, Louisiana 70160-0267

Re: Parish of East Baton Rouge
Amite River and Tributaries
Flood Control Feasibility Study

Dear Colonel Diffley:

Historically the citizens of the City of Baton Rouge and Parish of East Baton Rouge (City-Parish) have experienced substantial flood damage whenever rainfall runoff exceeded the capacity of the City-Parish's major conveyance channels. The City-Parish Government appreciates this opportunity to assist the citizens of East Baton Rouge Parish by participating in the above captioned study. By Metropolitan Council Resolution No. 34360 dated September 8, 1993, a copy of which is attached for your convenience, I have been authorized to execute this letter indicating the City of Baton Rouge and Parish of East Baton Rouge intends to be the local sponsor for the East Baton Rouge Parish Flood Control Program.

The Department of Public Works has reviewed the tentatively selected plan included in the East Baton Rouge Parish Flood Control Feasibility Study and the Environmental Impact Study and based on these plans, the City-Parish intends to be the local sponsor of said plan. The City-Parish of East Baton Rouge realizes that if it becomes the sponsor it will be responsible to make the necessary cash contributions; to acquire the land, easements, rights-of-way; and to operate, maintain, and rehabilitate the project as needed after completion of the initial project construction. Both the City of Baton Rouge and the Parish of East Baton Rouge are authorized by law to engage in cooperative endeavors with the federal government, and the City-Parish intends to enter into a binding agreement with the federal government at the appropriate time.

Colonel Michael Diffley
September 14, 1993
Page 2

On behalf of the members of the Metropolitan Council, I wish to thank you and all members of your staff that have worked on this project for reducing flooding in East Baton Rouge Parish.

Sincerely,

Tom Ed McHugh

Tom Ed McHugh
Mayor-President

TEM:gr
Attach.
cc: Honoroble Members of the Metropolitan Council

APPROVED AS TO FORM

PARISH ATTORNEY'S OFFICE

METROPOLITAN COUNCIL

SEP 8 1993

Donald Nijoka
COUNCIL ADMINISTRATOR

776

RESOLUTION 34360

AUTHORIZING THE MAYOR-PRESIDENT TO EXECUTE A LETTER AGREEMENT OF INTENT TO BE THE LOCAL SPONSOR FOR THE EAST BATON ROUGE PARISH FLOOD CONTROL PROGRAM.

BE IT RESOLVED by the Metropolitan Council of the Parish of East Baton Rouge and City of Baton Rouge that the Mayor-President, on behalf of the City of Baton Rouge and Parish of East Baton Rouge, is hereby authorized to execute a letter agreement of intent to be the local sponsor for the East Baton Rouge Parish Flood Control Program, said letter being substantially in the form as attached hereto and made a part hereof as though copied herein in extenso.

CERTIFIED
A TRUE COPY

SEP 13 1993

Dorothy Dunn
COUNCIL ADMINISTRATOR'S OFFICE

Recreation and Park Commission
for the Parish of East Baton Rouge

3140 N. Sherwood Forest Drive
P. O. Box 15887, Baton Rouge, Louisiana, 70895
Telephone (504) 272-9200
FAX (504) 273-6404

August 25, 1993

Colonel Michael Diffley
District Engineer, New Orleans District
U.S. Army Corps of Engineers
Post Office Box 60267
New Orleans, LA 70160-0267

RE: East Baton Rouge Parish Flood Control Study
Comite River Diversion Project

Dear Colonel Diffley:

The Recreation and Park Commission for the Parish of East Baton Rouge Parish (BREC) strongly recommends that all mitigation areas for East Baton Rouge projects be located in this parish.

BREC has been working with the Corps and local officials on different issues, planning, recreation and land areas, and operations. In the planning of the proposed flood control projects, land areas in the Parish have been identified to the Corps (some adjacent to existing parks) for possible use as habitat mitigation areas.

Conservation of our natural resources for present and future generations is part of our System Master Plan. This objective is most compatible with the required mitigation land development. Therefore, the BREC Commission is very interested in expanding on discussion to the program and operation of this mitigation area.

The Commission recognizes the responsibilities of the local sponsor in operation and maintenance of all features, including mitigation, of the proposed project. The Commission is most interested in becoming the agent of the local sponsor in carrying out the activities specifically for the mitigation features and fully intends to carry out those activities at the appropriate time if so requested by the local sponsor.

Sincerely,

Eugene A. Young

Eugene A. Young
Superintendent

WGP:agt

c: Bill Wilson, Corps of Engineers
Jerry Klier, DPW Engineer

DRAFT
ENVIRONMENTAL IMPACT STATEMENT

DRAFT
ENVIRONMENTAL IMPACT STATEMENT
AMITE RIVER AND TRIBUTARIES
LOUISIANA
EAST BATON ROUGE PARISH WATERSHED
FLOOD CONTROL PROJECT

FEBRUARY 1995

LEAD AGENCY: U.S. Army Corps of Engineers, New Orleans District
COOPERATING AGENCY: Louisiana Department of Transportation and Development

ABSTRACT: A recommended solution has been developed for the flooding problems of the East Baton Rouge Parish watershed, which is a sub-basin of the Amite River Basin within southern Louisiana. The watershed consists essentially of the Baton Rouge urban area. Major floods in recent years occurred in 1973, 1977, 1979, 1983, and 1990. The 1983 flood was the flood of record and caused damages of $65,000,000. Variations of structural and non-structural alternatives were considered in early planning. Non-structural alternatives considered in specific subdivisions consisted of buy-out or relocation of structures subject to repetitive flooding, and raising structures. Late stage planning consisted of the development of channel modification plans. Economically justifiable flood control alternatives were developed for five basins within the parish. The basins are Beaver and Blackwater east and north of the Comite River; and Jones, Ward, and Fountain south of the Comite River. The Tentatively Selected Plan chosen for each basin was the one that produced the greatest economic benefits over costs. A total of approximately 66 miles of channel would be modified. This consists of approximately 25 miles of minimal clearing and snagging, 24 miles of earthen channel enlargement, and 17 miles of concrete lining of channels. Recreation features consist of construction of 11 miles of bicycle paths on the Jones basin which would also include plantings of trees. Aesthetic mitigation features consist of plantings of trees or trees and shrubs along both sides of 29.4 miles of waterways. Habitat mitigation is combined for the five basins and consists of acquisition and reforesting of a total of 397 acres of open lands. The lands would be near existing parks, as practical, within the parish and would be managed as wooded parks.

DATE: ____________________ APR 14 1995

Please send your comments to the District Engineer by the date stamped above. If you would like further information regarding this statement, please contact Mr. Bill Wilson, U.S. Army Engineer District, New Orleans, P.O. Box 60267, New Orleans, Louisiana 70160-0267. Telephone: (504) 862-2527.

NOTE: Information, displays, maps, etc., discussed in the Feasibility Report are incorporated by reference in the Environmental Impact Statement.

1. SUMMARY

1.1. MAJOR CONCLUSIONS AND FINDINGS

1.1.1. Purpose and Alternatives. The purpose of this study is to determine the feasibility of reducing flood damages within the urban area of East Baton Rouge Parish.

1.1.2. Rationale for Tentatively Selected Plan. The alternative selected as the Tentatively Selected Plan within each basin is the plan with the greatest economic benefits over costs.

1.1.3. Environmental Losses. The most significant environmental losses would be the loss of (1) the aesthetic appeal of wooded edges adjacent to streams traversing through the otherwise brick and concrete of the city and (2) bottomland hardwood forest habitat adjacent to the streams of the project area.

1.1.4. Environmental Features. Features are incorporated in the Tentatively Selected Plan for each basin to mitigate the loss of bottomland hardwood forest habitat. Features to mitigate aesthetic losses are also incorporated into each alternative.

1.1.5. Endangered Species. A request was sent to the U.S. Fish and Wildlife Service (USFWS) for information on endangered species regarding requirements for the project as currently designed. The responding correspondence mentions the inflated heelsplitter and the bald eagle, but indicates that the USFWS anticipates no adverse effect to the inflated heelsplitter under current project design. The USFWS reports that the concern for the eagle is for an inactive nest that has not been used since the 1990 mating season. Since inactive nests are monitored for five years, they advise the District to contact their office prior to contracting any work proposed within one mile of the existing nest to determine if the nest is occupied. The draft Fish and Wildlife Coordination Act Report, Appendix F of this document, dated June 1994, provides this same caution. A concern was voiced in 1990 by the Louisiana Department of Wildlife and Fisheries, Natural Heritage Program, for a unique tract of old growth woodlands in the Ward Creek basin. The design of the Tentatively Selected Plan would not include construction in that area; therefore, the identified tract would not be impacted.

1.1.6. Executive Order 11988. E.O. 11988, Floodplain Management, deals with minimizing or avoiding impacts associated with the base floodplain unless there is no practicable alternative. Project implementation would result in the removal of approximately 2,429 residencies from the 100-year floodplain. This removal would occur essentially because of the reduction of stages within the basins that would be produced by the 100-year storm. Stage reductions vary in different parts of the study area. No project benefits were projected for the conversion of wooded lands to developed lands within the 100-year floodplain. Project benefits were confined to flood losses prevented to existing

residential and commercial development. They did not include any possible benefits that would occur to future developed areas with project implementation. Project impacts to those significant resources within the 100-year floodplain are discussed primarily within the sections on bottomland hardwood forests, aquatic resources, and socioeconomic resources. Public notice of possible Federal actions to be recommended within the floodplain was made at the public meeting of October 30, 1984, the Notice of Intent in the Federal Register on February 12, 1988, and the scoping announcement of March 4, 1988.

1.1.7. Executive Order 11990. E.O. 11990, Protection of Wetlands, was considered in project planning. The decision to transport excavated material from Beaver Bayou, Blackwater Bayou, and Jones Creek watersheds to the city/parish landfill would significantly reduce adverse impacts to wetlands. Therefore, any plan included in the final array of alternatives, including the Tentatively Selected Plan, for those watersheds produces comparatively minimal effects on wetlands. Placing excavated material from Ward Creek and Bayou Fountain watersheds in Mississippi River levee borrow pits to just below the level of the surrounding batture would impact wetlands by changing an area of deep water area to a moist soil and shallow water forested wetland area.

1.1.8. Clean Water Act/Section 404(b)(1) Evaluation. A 404(b)(1) Evaluation was completed for the applicable features of the Tentatively Selected Plan for each of the watersheds. Use of any selected disposal sites would not harm any endangered species or their critical habitat. Placement of the fill material (concrete, riprap, geotextile, or excavated material) for the Tentatively Selected Plan for any watershed would not be expected to result in significant violation of applicable Louisiana Water Quality Standards. The proposed discharge would not result in unacceptable adverse effects on human health and welfare, including municipal and private water supplies and aesthetics, recreational and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. The life stages of aquatic life and other wildlife would not be adversely affected. Significant adverse effects on aquatic ecosystem diversity, productivity and stability, recreational, aesthetic, and economic values would not occur. On the basis of the guidelines, the proposed discharge sites for the Tentatively Selected Plan for each basin are specified as complying with the requirements of these guidelines, with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects to the aquatic ecosystem. Application is currently under review by the Louisiana Department of Environmental Quality for State Water Quality Certification for the Tentatively Selected Plan of each watershed as described in this report.

1.2. HAZARDOUS, TOXIC, AND RADIOACTIVE WASTES

Hazardous, toxic, and radioactive wastes (HTRW) are of concern because of several statutes. One of the most, if not the most, significant statutes from the standpoint of construction is the Comprehensive, Environmental Response, Compensation and Liability

Act (CERCLA). CERCLA addresses, among other things, the assignment of liability regarding HTRW issues. Since liability for HTRW response is a cost that is to be born totally by the local sponsor, it is of obvious concern to any potential sponsor. The HTRW issue is discussed, not in the body of this statement but in Appendix D. The significance of those materials, of course, is not from a positive, but from a negative value standpoint. Appendix D contains records of occurrences within a large portion of East Baton Rouge Parish of regulated and unregulated materials from several databases of different regulatory agencies. Additionally, the appendix also presents observation records of a visual site survey where construction is proposed on the different watercourses. The data collection and surveys are to aid in establishing the requirements to implement the study objectives in such a way as not to impact upon hazardous, toxic, and radioactive wastes. If such wastes are found through future surveys of this nature, it is the intent to mitigate by avoidance or to modify construction in sites where those wastes are considered to be potential problems. Appendix D also includes a sensitivity analysis that identifies specific points of concern regarding HTRW and potential impacts to plan formulation. The sensitivity analysis includes a probability of HTRW occurrence within each watershed and the potential for affect on project design. Additional HTRW investigations will be accomplished in later preconstruction, engineering, and design studies.

1.3. AREAS OF CONTROVERSY AND UNRESOLVED ISSUES

There are no areas of controversy or unresolved isssues associated with the Tentatively Selected Plan for any basin.

1.4. ENVIRONMENTAL COMMITMENTS

A number of concerns have been raised during project planning that have resulted in features being developed and included in the Tentatively Selected Plan. These concerns, with the resulting commitments, are presented in Table 1.

TABLE 1

ENVIRONMENTAL COMMITMENTS
FOR THE TENTATIVELY SELECTED PLAN
EAST BATON ROUGE PARISH PROJECT, LOUISIANA [1]

APPLICABLE RESOURCE	CONCERN	COMMITMENT	LOCATION IN EIS (Para. #)
Forestlands	Wildlife habitat	For mitigation the sum of the losses of all watersheds, approximately 397 acres of open land will be reforested with several species of oaks (Nuttall, cherrybark, willow, and water), and pecan for mast production. Planting rate will be 300 seedlings per acre. Minimal numbers of boxelder and cottonwood will be planted for rapid growth and to provide individuals for injection for cavities for cavity nesting species. Reforestation will be done on lands adjacent to local parks as possible for efficiency of management. Areas will be provided stewardship to assure the development of the habitat described. Approximately 115 acres, or more if practical, would be planted adjacent to BREC park facilities and the remainder would be planted on an area near Joor Road.	4.3.1.4.2 and Tables 4-6-1 through 4-6-5
Esthetics	Visual screen	Trees and shrubs would be planted along the respective waterways for the following miles: Jones - 4.25; Ward - 1.5; Fountain - 2.5; Beaver - 7.6; and Blackwater - 13.5.	4.3.1.3.1
Cultural Resources	Cultural Resources	Cultural resources studies will be completed in accordance with the National Historic Preservation Act of 1966, as amended, and in accordance with the schedule.	5.2.1.5., 5.2.2.5 ... 5.2.5.5.
Recreation Resources	Develop-ment Plan	Bike path of approximately 11 miles would be constructed adjacent to Jones Creek. Construction of path would include the planting of hardwood trees approximately 25 feet apart on each stream bank.	4.2.1.3.
Noise	Construct-ion noise	Construction will be accomplished only during daylight hours.	5.2.1.8. 5.2.2.8. 5.2.3.8. 5.2.4.8. 5.2.5.8.

[1] Commitment to be met by inclusion in the plans and specifications with subsequent transmittal to the field.

2. TABLE OF CONTENTS

2. TABLE OF CONTENTS (Continued)

2. TABLE OF CONTENTS (Continued)

3. NEED FOR AND OBJECTIVES OF STUDY

3.1. STUDY AUTHORITY

The study is part of the Amite River and Tributaries Study authorized by a resolution adopted April 14, 1967, by the Committee on Public Works of the United States Senate at the request of former Senator Russell B. Long and the late Senator Allen J. Ellender. Due to the complex nature of the flood problems, the feasibility phase studies were divided along hydrological and political boundaries to advance the study process. Seven watersheds were identified as having the potential for Federal participation in flood control studies. This study focuses on the East Baton Rouge Parish basin and is an interim response to the authorizing resolution.

3.2. PUBLIC CONCERNS

The public is concerned about flooding within the urban portion of East Baton Rouge Parish. This flooding originates from excessive rainfall resulting in headwater and backwater overflow of the tributary streams of the Amite and Comite Rivers. From 1973 to 1993, major floods occurred in the Amite basin. The maximum flood of record occurred in 1983 and caused an estimated $65,200,000 in damages in East Baton Rouge Parish. The loss of bottomland hardwood habitat and urban green spaces is also of concern.

3.3. PLANNING OBJECTIVES

The following planning objectives were developed by the interdisciplinary study team and guided the study process:

- Reduce flood damages associated with headwater and backwater flooding of tributary streams in East Baton Rouge Parish.

- Minimize streambank erosion in areas where channel modifications are required.

- Minimize significant adverse environmental impacts associated with the implementation of flood control measures.

- Minimize, to the greatest extent possible, the destruction of archeological and historical resources.

- Minimize particularly the loss of bottomland hardwood forests, or if not possible, mitigate those losses "in-kind" to the extent possible.

- Accomplish all mitigation activities within East Baton Rouge Parish.

- Incorporate, to the greatest extent justifiable, recreation measures in flood control plans.

- Incorporate, to the greatest extent possible, aesthetic mitigation measures in project design.

4. ALTERNATIVES

4.1. GENERAL. Seven watersheds within East Baton Rouge Parish were studied. These include Beaver and Blackwater bayous north and east of the Comite River; Jones Creek, Clay Cut Bayou, Ward Creek, Bayou Fountain, and Bayou Manchac south of the Comite River and within the central and southern portion of the urban area. Numerous structural and non-structural alternatives were evaluated for each watershed. Economically justifiable alternatives were developed for Beaver and Blackwater Bayous, Jones Creek, Ward Creek, and Bayou Fountain. No economically justifiable plans were identified for Clay Cut Bayou or Bayou Manchac.

4.2. PLANS ELIMINATED FROM FURTHER STUDY

4.2.1. Jones Creek basin

4.2.1.1. Plan JCCL-P2. Concrete lined 25-Yr main stem plus tributaries. This alternative was not economically justified.

4.2.1.3. Plan JCCL-P4. Concrete lined 25-Yr main stem only. Not economically justified.

4.2.2. Ward Creek basin

4.2.2.1. Plan WCC-P1. Concrete lined 25-Yr main stem only. Not economically justified.

4.2.2.2. Plan WCC-P2. Concrete lined 50-Yr main stem only. Not economically justified.

4.2.2.3. Plan WCC-P3. Concrete lined 100-Yr main stem only. Not economically justified.

4.2.2.4. Plan WCC-P4. Concrete lined 25-Yr main stem plus Dawson Creek and North Branch Ward Creek. Not economically justified.

4.2.2.5. Plan WCC-P4A6. Concrete lined. Not economically justified.

4.2.2.6. Plan WCC-P5. Concrete lined 25-Yr main stem plus tributaries. Not economically justified.

4.2.2.7. Plan WCC-P6. Concrete lined 50-Yr main stem plus tributaries. Not economically justified.

4.2.3. Bayou Fountain basin

4.2.3.1. Plan BF-25A. Earthen channel 25-Yr. Not economically justified.

4.2.3.2. Plan BF-25B. Earthen channel 25-Yr. Not economically justified.

4.2.3.3. Plan BF-25C. Concrete-lined channel 25-Yr. Not economically justified.

4.2.3.4. Plan BF-50. Earthen channel 50-Yr. Not economically justified.

4.2.3.5. Plan BF-50C. Concrete-lined channel 50-Yr. Not economically justified.

4.2.3.6. Plans BFPS 300, 600, and 900. Pump station with 300, 600, and 900 cubic feet per second (cfs) capacity and each including associated barrier levee. Not economically justified.

4.2.3.7. Plans UBF350A and B. Pump station located on Upper Bayou Fountain with and without flow diversion to the Mississippi River. Not economically justified.

4.2.3.8. MEADRL and HHLPRC. Ring levees around Meadow Bend and Highland Park Subdivisions. Not economically justified.

4.2.3.9. BUYOUT 10 and 25. Buyout of properties in the 10 and 25 year floodplains. Not economically justified.

4.2.3.10. Various combinations. Not economically justified.

4.2.4. Beaver Bayou basin

4.2.4. Plan Preliminary BBN-P1. Channel enlargement of 7.8 miles on Beaver Bayou and 3.7 miles on two tributaries (10-year design). Discharge of tributaries does not meet requirements for Federal participation.

4.2.5. Plan Preliminary BBN-P2. Channel enlargement of 7.8 miles on Beaver Bayou and 3.7 miles on two tributaries (25-year design). Discharge of tributaries does not meet requirements for Federal participation.

4.2.6. Plan Preliminary BBN-P3. Channel enlargement of 7.8 miles on Beaver Bayou and 3.7 miles on two tributaries (50-year design). Discharge of tributaries does not meet requirements for Federal participation.

4.2.4. Plan BBC-P7. Minimal concrete lined main stem plus tributaries. Comparatively weak economic justification.

4.2.4. Plan BBC-P8. Minimal concrete lined main stem only. Comparatively weak economic justification.

4.2.5. Blackwater Bayou basin

4.2.5.1. Plan BW-P1. Earthen channel 10-Yr main stem only. Not economically justified.

4.2.5.2. Plan BW-P3. Earthen channel 25-Yr main stem only. Not economically justified.

4.2.5.3. Plan BW-P5. Concrete lined 10-Yr main stem only. Not economically justified.

4.2.5.4. Plan BW-P6. Concrete lined 10-Yr main stem plus tributaries. Not economically justified.

4.2.5.5. Plan Prelininary BW-P2. Channel enlargement of 8.8 miles on Blackwater Bayou and 6.7 miles on two tributaries (10-year design). Discharge on one of the tributaries does not meet requirements for Federal participation.

4.2.5.6. Plan Preliminary BW-P4. Channel enlargement of 8.8 miles on Blackwater Bayou and 6.7 miles on two tributaries (25-year design). Discharge on one of the tributaries does not meet requirements for Federal participation.

4.2.6. Clay Cut Bayou basin

4.2.6.1. Plan A. 25 Year concrete-lined channel. Not economically justified.

4.2.6.2. Plan B. Backwater control structure and barrier levee. Not economically justified.

4.2.6.3. Plan C. Earthen channel. Not economically justified.

4.2.7. Bayou Manchac basin. Pump station and barrier levee. Not economically justified.

4.2.8. Non-Structural Alternatives

Non-structural alternatives considered consisted of floodplain management, floodproofing of structures, raising structures in place, building small earthen levees of floodwalls, construction of small-scale ring levees around smaller areas or subdivisions, buy-out or

relocation of structures subject to repetitive flooding, and public acquisition of floodplain land. Although non-structural alternatives address the planning objectives reflecting concern for the environment, they did not address the flood damage reduction objective sufficiently to retain them for late-stage planning.

4.3. PLANS CONSIDERED IN DETAIL

General. Table 4-1 displays a concise summary with pertinent information of the plans considered in detail within the different watersheds.

4.3.1. Jones Creek basin

4.3.1.1. Plan JCCL-P1. The proposed plan for Jones Creek consists of widening approximately 18 miles of channel designed to convey in excess of a 25-year storm event within stream banks. Improvements on the main stem of Jones Creek are proposed from its mouth upstream to Lobdell Road. Also included are proposed improvements to the creek's two main tributaries as well as one sub-tributary. Proposed improvements to Weiner Creek begin at its confluence with Jones Creek and proceed upstream to Cedar Crest Avenue. Proposed improvements to Lively Bayou begin at its Jones Creek confluence and extend upstream to its crossing with the Illinois Central Railroad. Proposed improvements to the Lively Bayou Tributary begin at its confluence with Lively Bayou upstream and extend to Tams Drive (see Plates 16 and 44).

The proposed channel design calls for a five foot bottom width with 3:1 sloped banks. Both the channel bottom and banks are to be lined with concrete. This design remains constant for all of the above-listed channel reaches with the exception of the most downstream segment of Jones Creek. In this reach, from its mouth to Jones Creek Road, only channel clearing and snagging is proposed. Excavated material for this and all other alternatives within this watershed would be hauled to a city/parish landfill for disposal. Required operation and maintenance (O&M) for the channels consists of continuous inspection and debris removal, annual herbicide application on earthen channels, and pavements repairs as necessary. Clearing and snagging will be performed where necessary every 5 to 10 years maximizing the use of hand-held equipment. Herbicide application would be conducted in accordance with guidelines of the Environmental Protection Agency (see Appendix E, Section 7). Maintenance of the recommended combined project mitigation areas for the tentatively selected plans would include protection of the land and plantings to achieve the habitat value projected.

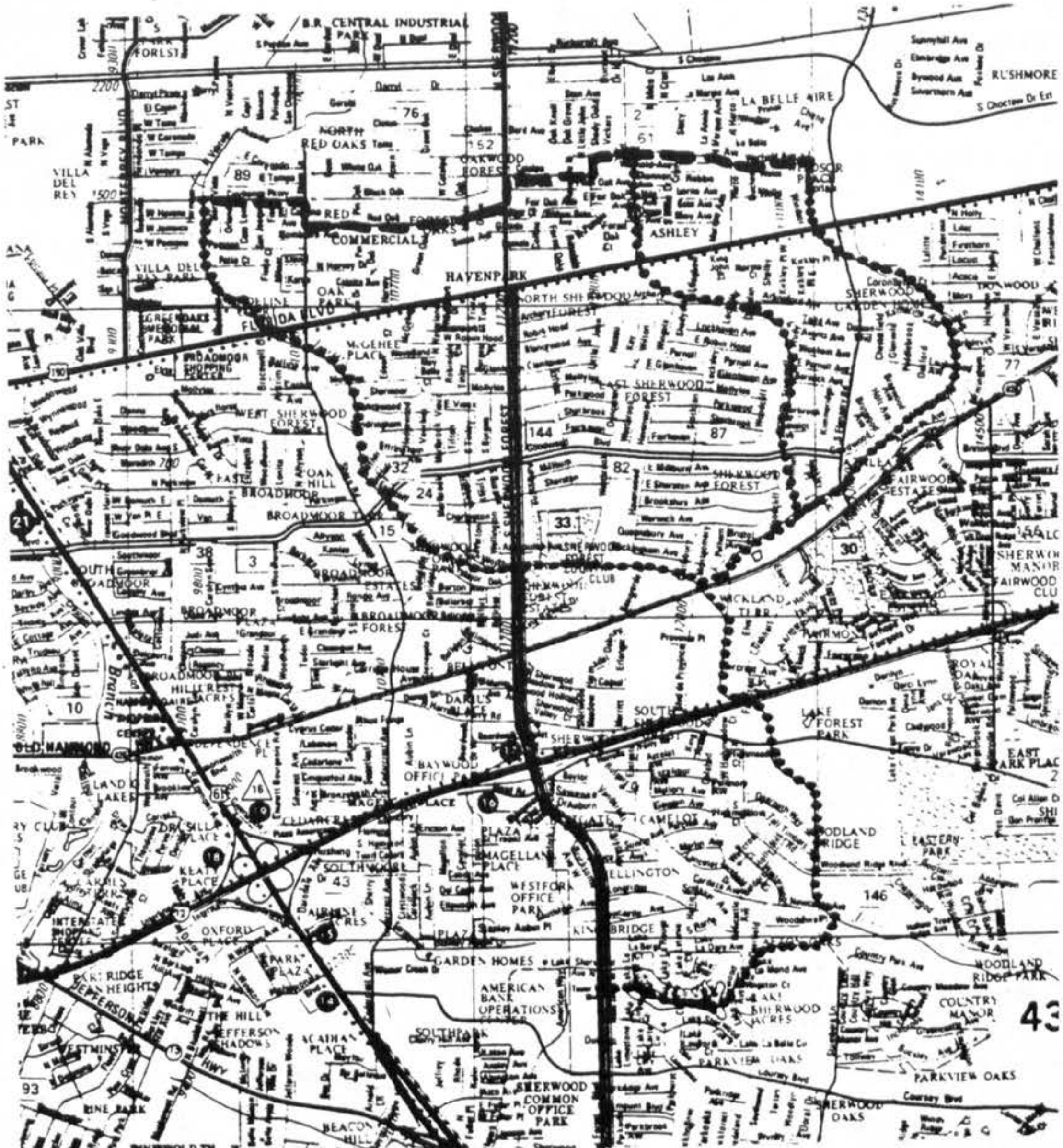
4.3.1.2. Plan JCCL-P3. This plan for Jones Creek consists of widening approximately 12 miles of channel designed to convey in excess of a 10-year storm event within stream banks. Improvements on the main stem of Jones Creek are proposed from its mouth upstream to Lobdell Road. No work is proposed for the tributaries. The proposed channel

design calls for a five foot bottom width with 3:1 sloped banks. Both the channel bottom and banks are to be lined with concrete. This design remains constant except for the most downstream segment of Jones Creek. In this reach, from its mouth to Jones Creek Road, only channel clearing and snagging is proposed. Required O&M would be similar to Plan JCCL-P1.

4.3.1.3. Recreation Development Plan. A recreational bike path would be a feature of any alternative considered within this watershed. The western fork of the Jones Creek bicycle path begins at Cuyhanga Parkway traversing the western stream bank in a southerly direction for approsimately 5 miles. At the convergence of Weiner Creek, the path would turn west along the northern bank of Weiner Creek for approximately one mile and end at South Sherwood Forest Boulevard near Lake Sherwood Avenue North. The northern segment of the center leg of the path would begin on the western bank of Lively Bayou Tributary at Tams Avenue. This portion of the path would extend approximately two miles south and adjoin the Lively Bayou eastern leg near Woodcliff Street. The northern beginning of the Lively Bayou eastern leg would begin at the dead end of Wallis Street and extend south for approximately 2.5 miles. A steel and wooden bridge, 10 by 50 feet, would be installed on the western side of Lively Bayou facilitating the crossing of Lively Bayou Tributary at its terminus with Lively Bayou. At that point, the path would continue on the western bank of Lively Bayou. At Old Hammond Highway, the path would continue on the northern right-of-way of the highway. A steel and wooden bridge, 10 by 150 feet, would be placed along this right-of-way crossing Jones Creek connecting the Lively Bayou path to the western side of the Jones Creek path. Tree planting would be included. Figure 1 graphically illustrates the bike path route. Dots represent the project bike path and dashes delineate the proposed street connector routes that contribute to a "riding circuit". The total length of the outer perimeter is 14 miles. The plan would also include any necessary operation, maintenance, and replacements.

4.3.1.4. Mitigation. Measures to mitigate both aesthetic and habitat losses for Jones Creek basin and all other basins were developed. Planning and plans are described below.

4.3.1.4.1. Aesthetic mitigation. Aesthetic mitigation has been developed for each of the alternatives for each of the basins. The loss of top-of-bank trees and shrubs will be mitigated on site by replacement with similar vegetation. The Jones Creek plan, as well as the plans for Ward Creek and Bayou Fountain basins, consists of replanting both hardwood trees and shrubs with a spacing of 25 and 15 feet, respectively, for a total of 402 and 704 units per mile. Plantings would be done on both sides of the channels. However, the plans for the Beaver and Blackwater basins would consist of planting hardwood trees only. The Jones, Ward, and Fountain basins are in heavily populated urban environments, whereas Beaver and Blackwater basins are in rural areas. This rural versus urban project setting determines the extent of replacement vegetative plantings. The rationale for this planting scheme is that the losses are more significant simply because of the number of



JONES CREEK RECREATION PLAN

●●●●●●●● Project bike path, 11 miles

– – – – – – Street connector route (non-project)

0 1

Scale: 1.5" =1.0 Miles

Figure 1

visual observations lost in an urban setting when compared to a sparsely populated rural site. Since potential significant aesthetic losses are greater in urban areas, more intense and immediate mitigative planting is required in these areas. However, population density in rural areas is low; therefore, potential aesthetic losses are not as great and are less in intensity than in urbanized areas. Open farm lands and more expansive wooded tracts dominate the rural areas; therefore, only hardwood trees will be planted along these impacted stream banks. Linear miles of tree/shrub aesthetic mitigation for the individual Tentatively Selected Plans are 4.25, 1.5, 2.5, 7.6, and 13.5, for the Jones, Ward, Fountain, Beaver, and Blackwater basins, respectively. Appendix E, Section 2 explains the details of the aesthetic plan.

4.3.1.4.2. Habitat mitigation. Habitat mitigation needs for the Tentatively Selected Plan for the Jones Creek basin and all other basins were summed to produce the total need for all. The total plan, therefore, is made up of the mitigation needs of all basins and the plan for the Tentatively Selected Plan for any basin can be allocated according to the individual mitigation need. The plan consists of creating bottomland hardwood habitat on lands expected to remain, if the project were not to be implemented, in an open or unforested status. The combined mitigation plan is to acquire and reforest by planting approximately 397 acres of open land. Lands adjacent to, or nearby, as practical, land owned and operated, by the Recreation and Park Commission for the Parish of East Baton Rouge (BREC) would be a priority for acquisition and management. Since all of the mitigation needs could not be compensated cost effectively in this manner, the residual needs would be compensated by the acquisition and reforesting by planting another open area(s) located off Joor Road and near Highway 64 (or as available). Approximately 115 acres would be acquired and reforested near BREC facilities and approximately 282 residual acres would be located at the other site(s) (see Figures 52 and 53). Fencing of the area would be required. Stewardship of the area would be required to see that the planted trees are protected and to achieve the habitat value projected. The plan would also include operation and maintenance as well as any necessary replacements. Perimeter fencing would require replacements. The lands required for the individual Tentatively Selected Plans are 99, 28, 21, 122, and 127 acres, for the Jones, Ward, Fountain, Beaver, and Blackwater basins, respectively. Acreages required for mitigation for any other plans are presented in Tables 4-5-1 through 4-5-5. Mitigation is a component of each alternative within the final array.

4.3.2. Ward Creek basin

4.3.2.1. Plan JCCL-P4A5. The proposed alternative would provide approximately the 10-year level of protection and includes minimal clearing and snagging of the main stem of Ward Creek from its mouth to its termination just above Corporate Boulevard not including the newly enlarged and relocated section between Pecue and Siegen Lanes (see Plate 45). Also included is minimal clearing and snagging of Dawson Creek from its

mouth to its confluence with Bayou Duplantier just above Kenilworth Blvd. Also included is concrete lining of North Branch of Ward Creek between, and including, Interstate Highway 10 (I-10) to Interstate Highway (I-12) with a design channel section consisting of a 32-foot bottom width and 1V on 3H side slopes. Finally, an existing paved section in this reach of approximately 1,250 feet shall remain. No work on this tributary above I-12 is proposed. Although the work consists entirely of concrete lining or clearing and snagging, there may be some excavated material. Any excavated earthen material, trees, and stumps would be hauled to nearby borrow sites on the batture of the Mississippi River that have been created by obtaining materials for levee upgradings in recent years. Any other refuse would be hauled to the city/parish landfill. Required O&M for the channels consists of continuous inspection and debris removal, annual herbicide application, and pavements repairs as necessary. Clearing and snagging will be performed where necessary every 5 to 10 years maximizing the use of hand-held equipment. Herbicide application would be conducted in accordance with guidelines of the Environmental Protection Agency. Maintenance of the recommended combined project mitigation areas for the tentatively selected plans would include protection of the land and plantings to achieve the habitat value projected.

4.3.3. Bayou Fountain basin

4.3.3.1. Plan BF-10A. This plan for Bayou Fountain consists of clearing and or widening approximately 11 miles of channel designed to convey a 10-year storm event within stream banks. Improvements are proposed from the bayou's mouth upstream to Stoney Creek Avenue. The proposed channel design calls for clearing and snagging only for the entire reach with the exception of a section between Seigen and Gardere Lanes. In this reach, channel widening is proposed and consists of a 50-foot bottom width with 3:1 sloped banks. It is proposed that improvements be made to one major obstruction, a 60-inch sewer main crossing located at Mile 53.8 (approximately 1,000 feet upstream of Gardere Lane near Stoney Creek Avenue). The proposed design calls for the construction of a concrete "U-channel" with a 50-foot bottom width. Any excavated earthen material, trees, and stumps for this or any other alternative for this watershed would be hauled to nearby borrow sites on the batture of the Mississippi River that have been created by obtaining materials for levee upgradings in recent years. Any other refuse would be hauled to the city/parish landfill. Required O&M for the channels consists of continuous inspection and debris removal, annual herbicide application, and clearing and snagging where necessary every 5 to 10 years maximizing the use of hand-held equipment. Herbicide application would be conducted in accordance with guidelines of the Environmental Protection Agency. Maintenance of the recommended combined project mitigation areas for the tentatively selected plans would include protection of the land and plantings to achieve the habitat value projected.

4.3.3.2. Plan BF-10B. The proposed plan for Bayou Fountain consists of clearing and or widening approximately 11 miles of channel designed to convey a 10-year storm event within stream banks. Improvements are proposed from the bayou's mouth upstream to Ben Hur Road (see Plate 46). The proposed channel design calls for clearing and snagging only for the entire reach with the exception of a section between Seigen and Gardere Lanes. In this reach, channel widening is proposed and consists of a 50-foot bottom width with 3:1 sloped banks. It is proposed that improvements be made to one major obstruction, a 60-inch sewer main crossing located at Mile 53.8. The proposed design calls for the construction of a concrete "U-channel" with a 50-foot bottom width. Excavated material disposal and required O&M would be similar to Plan BF-10A.

4.3.4. Beaver Bayou basin

4.3.4.1. Plan BBN-P1. This plan for Beaver Bayou consists of widening approximately 7.8 miles of channel designed to convey a 10-year storm event within stream banks. Modifications are proposed from Frenchtown Road, where recent improvements are in place from this point to the mouth of the bayou, upstream to Hubbs Road. The proposed channel design is earthen with 3.5:1 bank slopes. In order to control erosion, banks are proposed to be protected with a geosynthetic mat. R-90 stone would hold the mat in place. Design bottom widths vary for each reach. Required O&M for the channel consists of continuous inspection and debris removal, annual herbicide application, and clearing and snagging. Clearing and snagging would be performed where necessary every 5 to 10 years maximizing the use of hand-held equipment. Herbicide application would be conducted in accordance with guidelines of the Environmental Protection Agency. Maintenance of the recommended combined project mitigation areas for the tentatively selected plans would include protection of the land and plantings to achieve the habitat value projected.

4.3.4.2. Plan BBN-P2. The proposed plan for Beaver Bayou consists of widening approximately 7.8 miles of channel designed to convey a 25-year storm event within stream banks. As with Plan BBN-P1, modifications are proposed from Frenchtown Road, upstream to Hubbs Road (see Plate 42). The proposed channel design is earthen with 3.5:1 bank slopes. In order to control erosion, banks are proposed to be protected with a geosynthetic mat. Design bottom widths vary for each reach. Required O&M would be similar to Plan BBN-P1.

4.3.4.3. Plan BBN-P3. This alternative would be the same as Plan BBN-P1, except it would be constructed to provide a 50-year level of protection.

4.3.5. Blackwater Bayou basin

4.3.5.1. Plan BW-P2. The proposed plan for Blackwater Bayou consists of widening approximately 13.4 miles of channel designed to convey a 10-year storm event within

stream banks. Improvements on the main stem of Blackwater Bayou are proposed from Hooper Road upstream to Highway 64 (Greenwell Springs Road). Minor actions may be necessary on the segment from the mouth to Hooper Road. Also included are proposed improvements to the bayou's main tributary. Proposed widening of Tributary 1 begins from its confluence with Blackwater Bayou upstream to McCullough Road (see Plate 42). The proposed channel design is earthen with 3.5:1 bank slopes. In order to control erosion, banks are proposed to be protected with a geosynthetic mat. Design bottom widths vary for each reach. Required O&M for the channels consists of continuous inspection and debris removal, annual herbicide application, and clearing and snagging. Clearing and snagging will be performed where necessary every 5 to 10 years maximizing the use of hand-held equipment. Herbicide application would be conducted in accordance with guidelines of the Environmental Protection Agency. Maintenance of the recommended combined project mitigation areas for the tentatively selected plans would include protection of the land and plantings to achieve the habitat value projected.

4.3.5.2. Plan BW-P4. This plan for Blackwater Bayou consists of widening approximately 13.4 miles of channel designed to convey a 25-year storm event within stream banks. Improvements on the main stem of Blackwater Bayou are proposed from Hooper Road upstream to Greenwell Springs Road. Minor actions may be necessary on the segment from the mouth to Hooper Road. Also included are proposed improvements to the bayou's main tributary. Proposed widening of the tributary is from its confluence with Blackwater Bayou upstream to McCullough Road. The proposed channel design is earthen with 3.5:1 bank slopes. In order to control erosion, banks are proposed to be protected with a geosynthetic mat. Design bottom widths vary for each reach. Required O&M would be similar to Plan BW-P2.

4.4. PLAN IMPLEMENTATION RESPONSIBILITY

The Federal government would prepare detailed designs, plans, and specifications and would bear 75 percent of the final costs of the plan that is recommended. Non-Federal interests would bear 25 percent of the costs and would provide all lands, easements, and rights-of-way, accomplish all relocations; hold and save the U.S. free from damages; and operate and maintain all features.

4.5. FUTURE CONDITIONS WITHOUT PROJECT / NO ACTION

With no Federal action to address the flooding problems of the study area, the flooding problems experienced in recent years would reoccur and possibly result in more extensive damages. The expansion of the city would continue with the majority of development generally occurring in a south-easterly direction. That development would occur at the expense of the minimal amount of farmed land and remaining wooded tracts in the area. Water quality would be slightly improved due to the implementation of the Louisiana

Water Quality Management Plan. However, the aquatic resources of the area would continue to remain of low quality due to urban runoff being such a large portion of the flows. Continued flooding and sedimentation would further obscure potentially significant cultural resources while future development would continue to threaten these resources. Continued development will continue to diminish those characteristics that give the waterways their aesthetic appeal. Socioeconomic factors resulting from the possibility of, and after-effects of, flooding would continue to be experienced by residents and landowners in the area.

4.6. COMPARATIVE IMPACTS OF ALTERNATIVES

Tables 4-6-1 through 4-6-5 present in comparative form the significance of resources and the effects of the no action and action alternatives considered on significant resources and plan economic characteristics. Detailed information about impacts on significant resources described in these tables is included in Section 5, Affected Environment and Environmental Effects for each watershed.

TABLE 4-1
DETAILED OR FINAL ARRAY OF ACTION ALTERNATIVES

ALTERNATIVE	SEGMENT	SIZE [1]	FROM	TO	MILES	TYPE WORK
Jones Cr.	Jones Cr	10	Mouth	Jones Cr Rd	3.4	Clr & Sng
JCCL-P1	Jones Cr	10	Jones Cr Rd	Lobdell Blvd	9.0	Concr Lined
(TSP) [2]	Weiner Cr	10	Jones Cr	Cedar Crest Ave	2.0	Concr Lined
	Lively B.	10	Mouth	Ill. Central RR	3.3	Concr Lined
	Lively Trib	10	Mouth	Tams Dr	2.0	Concr Lined
	TOTAL				19.7	
Jones Cr.	Jones Cr	10	Mouth	Jones Cr Rd	3.4	Clr & Sng
JCCL-P3	Jones Cr	10	Jones Cr Rd	Lobdell Blvd	9.0	Concr Lined
	Weiner Cr					No Work
	Lively B					No Work
	Lively Trib					No Work
		TOTAL			12.4	

ALTERNATIVE	SEGMENT	SIZE [1]	FROM	TO	MILES	TYPE WORK
Ward Cr.	Ward Cr	25	Mouth	College Dr	9.2	Clr & Snag
WCC-P4A5	Dawson Cr	25	Ward Cr	B. Duplantier	3.7	Clr & Snag
(TSP)	N.Branch	25	Ward Cr	Just dwnstream of I-12	1.3	Concr Lined
	TOTAL				14.2	

ALTERNATIVE	SEGMENT	SIZE [1]	FROM	TO	MILES	TYPE WORK
B. Fountain	B. Fountain	10	Mouth	Siegen Ln	4.4	Clr & Sng
BF-10A			Siegen Ln	Gardere Ln	2.9	ChanEnlarg
			Gardere Ln	Stoney Cr Ave	0.8	Clr & Sng
	TOTAL				8.1	
B. Fountain	B. Fountain	10	Mouth	Siegen Ln	4.4	Clr & Sng
BF-10B			Siegen Ln	Gardere Ln	2.9	ChanEnlarg
(TSP)			Gardere Ln	Stoney Cr Ave	0.8	Clr & Sng
			Stoney Cr Ave	Ben Hur Rd	2.5	Clr & Sng
	TOTAL				10.6	

[1] SIZE = Size channel or year level of protection
[2] TSP = Tentatively Selected Plan

TABLE 4-1 (CONTINUED)
DETAILED OR FINAL ARRAY OF ACTION ALTERNATIVES

ALTERNATIVE	SEGMENT	SIZE[1]	FROM	TO	MILES	TYPE WORK
Beaver B.	Beaver B.	10	Frnchtwn Rd	Hubbs Rd	7.8	Chan Enlar
BBN-P1	TOTAL				7.8	
Beaver B.	Beaver B.	25	Frnchtwn Rd	Hubbs Rd	7.8	Chan Enlar
BBN-P2 (TSP)	TOTAL				7.8	
Beaver B.	Beaver B.	50	Frnchtwn Rd	Hubbs Rd	7.8	Chan Enlar
BBN-P3	TOTAL				7.8	

ALTERNATIVE	SEGMENT	SIZE[1]	FROM	TO	MILES	TYPE WORK
Blackwtr	Blackwater	10	Mouth	Hooper Rd	0.0	Minimal Work
BW-P2	Blackwater	10	Hooper Rd	La Hwy 64	8.8	Chan Enlar
(TSP)	Bwtr Trib 1	10	Mouth	McCullough Rd	4.6	Chan Enlar
	TOTAL				13.4	
Blackwtr	Blackwater	25	Mouth	Hooper Rd	0.0	Minimal Work
BW-P4	Blackwater	25	Hooper Rd	La Hwy 64	8.8	Chan Enlar
	Bwtr Trib 1	25	Mouth	McCullough Rd	4.6	Chan Enlar
	TOTAL				13.4	

TABLE 4-6-1
COMPARATIVE IMPACTS OF ALTERNATIVES
JONES CREEK BASIN

RESOURCE	SIGNIFICANCE	NO ACTION	PLAN JCCL-P1 (TSP)	PLAN JCCL-P3	
AGRICULTURAL LANDS	Food and fiber production, income production	Small reduction in acreage due to development.	99 acres converted by mitigation plan	66 acres converted by mitigation plan	
FORESTLANDS	Wildlife habitat, forest products, green areas, shade, temperature reduction, property buffers, noise barrier, air quality.	Projected development rate (to open or urban use) of -2.2996% per year would continue.	78 acres and 44 HUVs lost; lost HUVs compensated by gains of mitigation plan.	52 acres and 29 HUVs lost; lost HUVs compensated by mitigation plan.	
THREATENED AND ENDANGERED SPECIES	USFWS: no species in area streams; inflated heelsplitter in Amite River; bald eagle nested nearby, but away from project area	The inflated heelsplitter would continue to exist in the Amite.	Limited turbidity increase during construction and post project effects would not effect the heelsplitter.	Same as previous plan.	
AQUATIC RESOURCES	Water quality is poor due to urban runoff, habitat is generally good only for species requiring low oxygen and wading birds	Water quality improved with Parish plan to increase wastewater diversion to Miss. River; may result in increase of habitat quality; reduced low flows would result in reduced habitat quality, especially in summer	Concrete lining causes increases in system flushing and leaching from concrete, and reduction of habitat diversity. Clearing and snagging causes reduction in habitat diversity.	Same as previous plan.	
CULTURAL RESOURCES	Three recorded sites have received previous impacts. Only one has been evaluated.	Condition of recorded sites would likely remain unchanged.	Potential for impacts to known sites will be assessed;	Same as previous plan	
RECREATION RESOURCES	Population of 380,000+ produces high demand for recreation areas in the area	Increased demand would result in increase in recreational facilities	Recreation plan - 11-mile bike path. Use is projected to be 100,000 annual user days.	Similar to previous plan, but shorter bike trail and plantings because shorter flood control work.	
AESTHETICS	Pleasing vistas result in higher property values and come hither quality; results in increased tourism and higher tax base for city	Continued demand for scenic vistas, but pressure to develop all available space.	Significant adverse impacts; aesthetic mitigation plantings on both sides of 4.25 miles of channel would replace lost top-of-bank trees and shrubs.	Similar to previous plan; however, less impacts would require less mitigation	
NOISE	Low noise levels is desirable. Noise levels on channels are low except at road crossings	Noise levels would remain essentially unchanged.	Construction equipment would cause increased noise levels for as much as 72 months. This would be spread over four segments and not over the entire area for the entire period.	Same as previous plan for as much as 41 months.	
VECTORS	Common vectors include *Anopheles*, *Aedes*, *and Culex*	Populations would be kept in check with abatement program.	Same as no action.	Same as no action.	

TABLE 4-6-2
COMPARATIVE IMPACTS OF ALTERNATIVES
WARD CREEK BASIN

RESOURCE	SIGNIFICANCE	NO ACTION	PLAN WCC-4A5 (TSP)		
AGRICULTURAL LANDS	Food and fiber production, income production	Small reduction in acreage due to development	28 acres converted by mitigation plan		
FORESTLANDS	Wildlife habitat, forest products, green areas, shade, temperature reduction, property buffers, noise barrier, air quality,	Projected development rate (to open or urban use) of -2.296% per year would continue.	22 acres and 12 HUVs lost to project; habitat value lost is compensated by gains of mitigation plan.		
THREATENED AND ENDANGERED SPECIES	USFWS: no species in area streams; inflated heelsplitter in Amite River; bald eagle nested nearby, but away from project area	The inflated heelsplitter would continue to exist in the Amite.	This alternative would not affect the inflated heelsplitter.		
AQUATIC RESOURCES	Water quality is poor due to urban runoff, habitat is generally good only for species requiring low oxygen and wading birds	Water quality improved with Parish plan to increase wastewater diversion to Miss. River; may result in increase of habitat quality; reduced low flows would result in reduced habitat quality, especially in summer	Concrete lining causes increases in system flushing and leaching from concrete, and reduction of habitat diversity. Clearing and snagging causes reduction in habitat diversity.		
CULTURAL RESOURCES	Low probability for encountering significant resources due to previous channel maintenance	Condition of any sites would remain unchanged.	No change is projected. (Investigations completed under Feasibility Study.)		
RECREATION RESOURCES	Population of 150,000+ produces high demand for recreation areas in the area	Increased demand would result in increase in recreational facilities	This plan would have no impact on existing or proposed recreation development.		
AESTHETICS	Pleasing vistas result in higher property values and come hither quality; results in increased tourism and higher tax base for city	Continued demand for scenic vistas, but pressure to develop all available space.	Some adverse impacts will occur. Aesthetic mitigation plantings on both sides of 1.5 miles of channel would replace lost top-of-bank trees and shrubs.		
NOISE	Low noise levels is desirable. Noise levels on channels are low except at road crossings	Noise levels would remain essentially unchanged.	Construction equipment would cause increased noise levels for as much as 18 months		
VECTORS	Common vectors include *Anopheles*, *Aedes*, and *Culex*	Populations would be kept in check with abatement program.	Same as no action.		

TABLE 4-6-3
COMPARATIVE IMPACTS OF ALTERNATIVES
BAYOU FOUNTAIN BASIN

RESOURCE	SIGNIFICANCE	NO ACTION	PLAN BF-10A	PLAN BF-10B (TSP)	
AGRICULTURAL LANDS	Food and fiber production, income production	Small reduction in acreage due to development	18 acres converted by mitigation plan	21 acres converted by mitigation plan	
FORESTLANDS	Wildlife habitat, forest products, green areas, shade, temperature reduction, property buffers, noise barrier, air quality.	Projected development rate (to open or urban use) of -2.625% per year would continue.	15 acres and 8 HUVs lost to project; habitat value lost is compensated by gains of mitigation plan.	17 acres and 9 HUVs lost to project; habitat lost is compensated by mitigation plan.	
THREATENED AND ENDANGERED SPECIES	USFWS: no species in area streams; inflated heelsplitter in Amite River; bald eagle nested nearby, but away from project area	The inflated heelsplitter would continue to exist in the Amite.	This alternative would not affect the inflated heelsplitter.	Same as previous plan.	
AQUATIC RESOURCES	Water quality is poor due to urban runoff, habitat is generally good only for species requiring low oxygen and wading birds	Water quality improved with Parish plan to increase wastewater diversion to Miss. River; may result in increase of habitat quality; reduced low flows would result in reduced habitat quality, especially in summer	Channel enlargement cause increased flushing and reduction of habitat diversity. Clearing and snagging causes reduction in habitat diversity but not as much as channel enlargement.	Same as previous plan.	
CULTURAL RESOURCES	Four potentially significant sites likely to occur in project area.	Sites likely would remain undetected; bank and sheet erosion would continue to impact unrecorded sites.	Channel widening would result in greater chance of impacts; design could avoid significant sites.	Channel widening would result in greater chance of impacts; design could avoid significant sites.	
RECREATION RESOURCES	Population of 150,000+ produces high demand for recreation areas in the area	Increased demand would result in increase in recreational facilities	No impact on existing or proposed recreation development.	Similar to previous plan.	
AESTHETICS	Pleasing vistas result in higher property values and come hither quality; results in increased tourism and higher tax base for city	Continued demand for scenic vistas, but pressure to develop all available space.	Some adverse impacts will occur. Aesthetic mitigation plantings on both sides of 2.5 miles of channel would replace lost top-of-bank trees and shrubs.	Similar to previous plan, but less impacts and less mitigation.	
NOISE	Low noise levels is desirable. Noise levels on channels are low except at road crossings	Noise levels would remain essentially unchanged.	Noise levels would be increased by construction equipment for up to 12 months.	Similar to previous plan.	
VECTORS	Common vectors include *Anopheles, Aedes, and Culex*	Populations would be kept in check with abatement program.	Same as no action.	Same as previous plan.	

x

TABLE 4-6-4
COMPARATIVE IMPACTS OF ALTERNATIVES
BEAVER BAYOU BASIN

RESOURCE	SIGNIFICANCE	NO ACTION	PLAN BBN-P1	PLAN BBN-P2 (TSP)	PLAN BBN-P3
AGRICULTURAL LANDS	Food and fiber production, income production	Small reduction in acreage due to development	125 acres converted by mitigation plan	122 acres converted by mitigation plan	127 acres converted by mitigation plan
FORESTLANDS	Wildlife habitat, forest products, green areas, shade, temperature reduction, property buffers, noise barrier, air quality.	Projected development rate (to open or urban use) of -0.167% per year would continue.	88 acres and 55 HUVs lost to project; habitat value lost is compensated by gains of mitigation plan.	86 acres and 54 HUVs lost to project; habitat lost is compensated by mitigation plan.	89 acres and 56 HUVs lost to project; habitat lost is compensated by mitigation plan.
THREATENED AND ENDANGERED SPECIES	USFWS: no species in area streams; inflated heelsplitter in Amite River; bald eagle nested nearby, but away from project area	The inflated heelsplitter would continue to exist in the Amite.	This alternative would not affect the inflated heelsplitter.	Same as previous plan.	Same as previous plan.
AQUATIC RESOURCES	Water quality is poor due to urban runoff, habitat is generally good only for species requiring low oxygen and wading birds	Water quality improved with Parish plan to increase wastewater diversion to Miss. River; may result in increase of habitat quality; reduced low flows would result in reduced habitat quality, especially in summer	Channel enlargement causes increased flushing and reduction of habitat diversity. Geotech fabric would add some diversity to channel slopes and reduce expected erosion.	Same as previous plan.	Same as previous plan.
CULTURAL RESOURCES	Two potentially significant sites have been impacted by previous channel work; low probability for encountering more significant sites.	Condition of two recorded sites would remain unchanged.	Recorded sites will be evaluated; work design could avoid significant sites.	Same as previous plan.	Same as previous plan.
RECREATION RESOURCES	Population of 150,000+ produces high demand for recreation areas in the area	Increased demand would result in increase in recreational facilities	This plan would have no impact on existing or proposed recreation development.	Same as previous plan.	Same as previous plan.
AESTHETICS	Pleasing vistas result in higher property values and come hither quality; results in increased tourism and higher tax base for city	Continued demand for scenic vistas, but pressure to develop all available space.	Some adverse impacts would occur. Aesthetic mitigation plantings on both sides of 7.8 miles of channel would replace lost top-of-bank trees and shrubs. Natural succession, in time, would result in vegetation at edges of ROW.	Same as previous plan.	Same as previous plan.
NOISE	Low noise levels is desirable. Noise levels on channels are low except at road crossings	Noise levels would remain essentially unchanged.	Noise levels would be increased by construction equipment for up to 24 months.	Same as previous plan.	Same as previous plan.
VECTORS	Common vectors include *Anopheles, Aedes, and Culex*	Populations would be kept in check with abatement program.	Same as no action.	Same as previous plan.	Same as previous plan.

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TABLE 4-6-5
COMPARATIVE IMPACTS OF ALTERNATIVES
BLACKWATER BAYOU BASIN

RESOURCE	SIGNIFICANCE	NO ACTION	PLAN BW-P2 (TSP)	PLAN BW-P4	
AGRICULTURAL LANDS	Food and fiber production, income production	Small reduction in acreage due to development	127 acres converted by mitigation plan	217 acres converted by mitigation plan	
FORESTLANDS	Wildlife habitat, forest products, green areas, shade, temperature reduction, property buffers, noise barrier, air quality.	Projected development rate (to open or urban use) of -0.167% per year would continue.	77 acres and 48 HUVs lost to project; habitat value lost is compensated by gains of mitigation plan.	141 acres and 89 HUVs lost to project; habitat lost is compensated by mitigation plan.	
THREATENED AND ENDANGERED SPECIES	USFWS: no species in area streams; inflated heelsplitter in Amite River; bald eagle nested nearby, but away from project area	The inflated heelsplitter would continue to exist in the Amite River.	This alternative would not affect the inflated heelsplitter.	This alternative would not affect the inflated heelsplitter.	
AQUATIC RESOURCES	Water quality is poor due to urban runoff, habitat is generally good only for species requiring low oxygen and wading birds	Water quality improved with Parish plan to increase wastewater diversion to Miss. River; may result in increase of habitat quality; reduced low flows would result in reduced habitat quality, especially in summer	Channel enlargement causes increased flushing and reduction of habitat diversity. Geotech fabric would add some diversity to channel slopes and reduce expected erosion.	Same as previous plan.	
CULTURAL RESOURCES	Medium probability for encountering sites of significance; one site thought to have been modified — one potentially significant recorded site and one anticipated site.	Condition of one recorded site would remain unchanged; other unchanged sites would remain undetected.	Effort to identify and evaluate sites would be made; work design could avoid significant sites.	Same as previous plan.	
RECREATION RESOURCES	Population of 150,000+ produces high demand for recreation areas in the area	Increased demand would result in increase in recreational facilities	This plan would have no impact on existing or proposed recreation development.	Similar to previous plan.	
AESTHETICS	Pleasing vistas result in higher property values and come hither quality; results in increased tourism and higher tax base for city	Continued demand for scenic vistas, but pressure to develop all available space.	Some adverse effects would occur. Aesthetic mitigation plantings on both sides of 13.5 miles of channel would replace lost top-of-bank trees and shrubs. Native vegetation would become established via natural succession.	Same as previous plan.	
NOISE	Low noise levels is desirable. Noise levels on channels are low except at road crossings	Noise levels would remain essentially unchanged.	Noise levels would be increased by construction equipment for up to 24 months.	Similar to previous plan.	
VECTORS	Common vectors include *Anopheles*, *Aedes*, and *Culex*	Populations would be kept in check with abatement program.	Same as no action.	Same as previous plan.	

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TABLE 4-6-6
COMPARATIVE IMPACTS OF ALTERNATIVES
ALL BASINS

BASIN	ALTERNATIVE	ECONOMIC CHARACTERISTICS			
		Annual Benefits	Annual Costs	Net Benefits	B/C Ratio
Jones	No Action	N/A	N/A	N/A	N/A
	JCCL-P1 (TSP)	$6,715,000	$4,430,000	$2,285,000	1.52
	JCCL-P3	$4,877,000	$3,294,000	$1,583,000	1.48
Ward	No Action	N/A	N/A	N/A	N/A
	WCC-P4A5 (TSP)	$1,032,000	$932,000	$100,000	1.11
Fountain	No Action	N/A	N/A	N/A	N/A
	BF-10A	$416,000	$365,000	$51,000	1.14
	BF-10B (TSP)	$434,000	$373,000	$51,000	1.16
Beaver	No Action	N/A	N/A	N/A	N/A
	BBN-P1	$6,081,000	$1,115,000	$4,966,000	5.45
	BBN-P2 (TSP)	$7,154,000	$1,354,000	$5,800,000	5.28
	BBN-P3	$7,209,000	$1,477,000	$5,732,000	4.88
Blackwater	No Action	N/A	N/A	N/A	N/A
	BW-P2 (TSP)	$3,306,000	$887,000	$2,419,000	3.7
	BW-P4	$3,465,000	$1,195,000	$2,270,000	2.9

5. AFFECTED ENVIRONMENT/ENVIRONMENTAL EFFECTS

5.1. ENVIRONMENTAL CONDITIONS

The overall study area discussed in this document is the Amite River basin. The Amite River basin encompasses an area of approximately 2,000 square miles and includes portions of East Baton Rouge, Ascension, Livingston, East Feliciana, St. Helena, Iberville, St. James, and St. John the Baptist Parishes within Louisiana, and Amite County within Mississippi. The study area of this report is within this basin and consists of those portions of East Baton Rouge Parish subject to flooding of Beaver and Blackwater Bayous, Jones and Ward Creek, and Bayou Fountain. Action alternatives considered in this document would result in socioeconomic impacts and benefits to this described study area. Direct construction activities necessary for the implementation of any structural alternative would affect only a portion of the study area. That area, the area of project-induced flooding, and an area of Mississippi River levee borrow pits in the vicinity of Gardere Lane, jointly, for the remainder of this document is referred to as the affected area. Also included are portions of receiving waters immediately downstream of the mouths of each of these watercourses. This is but a small part of the overall study area. Two separate mitigation sites include an area near a facility of the Baton Rouge Recreation and Park Commission (BREC) and another site in the northern portion of the parish east of Joor Road and south of La. Hwy. 64. An alternative mitigation site that was evaluated was land adjacent to Bayou Duplantier from Stanford Avenue to near the confluence of Bayou Duplantier with Dawson Creek.

East Baton Rouge Parish is the westernmost of the Florida Parishes of Louisiana. The term, Florida Parishes, is used quite commonly when referring to this area and describes that portion of the state located east of the Mississippi River and north of Lakes Maurepas and Pontchartrain. The area is part of the original land area known as West Florida during colonial times.

The study area is of relatively low relief, with most portions being on the Pleistocene terrace land formation. Surrounding land elevations vary from highs of 120 feet National Geodetic Vertical Datum (NGVD) near the East Baton Rouge / St. Helena Parish line to approximately 5 feet NGVD near the confluence of Bayou Fountain with Bayou Manchac. Land elevations in the lower portion of the study area are approximately 30 feet NGVD at the western edge of the Pleistocene terrace before the drop-off occurs to the Mississippi River alluvial floodplain. The Mississippi River east bank levee within Louisiana begins at Baton Rouge. The study area contain a portion of the city limits of Baton Rouge. Commercial and residential development is essentially adjacent to or near major traffic arteries. The largest concentrations of undeveloped land are found in the northern portion of the study area.

5.2. SIGNIFICANT RESOURCES

A given resource is considered significant if it is identified in the laws, regulations, guidelines, or other institutional standards of national, regional, and local public agencies; if it is specifically identified as a concern by local public interests; or if it is judged by the responsible Federal agency to be of sufficient importance to be designated as significant (see Tables 5-1 and 5-2). This section discusses each significant resource occurring in the study area and listed previously in Tables 4-5-1 through 4-5-5, Comparative Impacts of Alternatives. The significance of the resource is first described. The effects of the no-action alternative and each of the action alternatives carried into the final array are also analyzed.

TABLE 5-1
ATTRIBUTES OF SIGNIFICANT RESOURCES

RESOURCE	ECOLOGICAL ATTRIBUTES	CULTURAL ATTRIBUTES	AESTHETIC ATTRIBUTES
AGRICULTURAL LANDS	Minor wildlife value	Reflects both present and past way of life for segment of population.	Vistas of farmland provide relief from clutter and technology of urban area.
FORESTLANDS	Valuable habitat for wildlife	Supports traditional extractive economy of area. Protects sites by avoiding disturbance.	Typical woodland landscape provides relief from clutter and technology of urban areas.
THREATENED AND ENDANGERED SPECIES	Rarity enhances significance of these species.	N/A	Individuals enjoy viewing of rare and endangered species.
AQUATIC RESOURCES	Water quality determines value for species. Several species of fishes and invertebrates use waters.	Fishing is a significant part of cultural heritage.	Meandering watercourses provide scenes of beauty.
CULTURAL RESOURCES	N/A	Indicators of history and inhabitants	Many cultural resources have high aesthetic value.
RECREATION RESOURCES	N/A	Association with outdoors is part of culture of area.	Park settings are perceived as aesthetic to most individuals.
ESTHETICS	None	A pleasant visual perception is a component of the culture of an area	N/A
VECTORS	Carrier of diseases to humans as well as other animals.	Generally considered to be a negative component	N/A
SOCIO-ECONOMIC RESOURCES	N/A	N/A	N/A

TABLE 5-2
RECOGNITION OF SIGNIFICANT RESOURCES

RESOURCE	INSTITUTIONAL RECOGNITION	TECHNICAL RECOGNITION	PUBLIC RECOGNITION
AGRICULTURAL LANDS	Farmland Protection Policy Act, Food Security Act of 1985	Production of food and fiber for large component of worlds population	Public recognizes value of productive agricultural land.
FORESTLANDS	Water Resources Development Act of 1986, Fish and Wildlife Coordination Act, EO 11990, EO 11988	Continued decline in Lower Mississippi Valley; value for noise abatement, increased residential real estate value, visual value, and air quality	Public recognizes value, scarcity, and continued decline of this resource in urban areas
THREATENED AND ENDANGERED SPECIES	Endangered Species Act, Bald Eagle Act	USFWS, NMFS, LDWF, & USACE cooperate to protect these species, Audubon Blue List recognizes rare species.	Public supports the preservation of rare or declining species.
AQUATIC RESOURCES	Clean Water Act of 1977, La Water Control Act, Fish and Wildlife Coordination Act, Coastal Zone Mgt Act of 1972, La State & Local Coastal Resources Mgt Act of 1978	USFWS, NMFS, LDWF, & USACE recognize value of good water quality and sustainable aquatic productivity.	Environmental groups and general public support the preservation of water quality and fishery resources.
CULTURAL RESOURCES	National Historic Preservation Act of 1966, Archeological Resource Protection of 1979	Sites are present in the vicinity of the proposed action.	Preservation groups support protection and enhancement of historical resources. There is strong avocational interest in archeology.
RECREATION RESOURCES	Land and Water Conservation Fund Act of 1965	EBR Parish has highly aggressive recreation program. 130+ facilities in parish	Public makes high demands on recreation areas and desires expansion of base; EBR Parish Horizon Land Use Plan
AESTHETICS	USACE ER 1105-2-100, National Environmental Policy Act	Greenlinks concept element of The Horizon Plan, the Comprehensive Land Use and Development Plan for East Baton Rouge Parish	Residents put value upon appealing scenes as reflected by land prices, trees on lots, and demand for parks, etc.
VECTORS	Mosquito abatement unit in local government	Several mosquitos are known carriers of disease.	Public supports active control program for offensive pests.
SOCIO-ECONOMIC RESOURCES	River and Harbor Flood Control Act	N/A	Social concerns and items affecting area economy are of significant interest to community.

5.2.1. **Jones Creek Basin**

5.2.1.1. AGRICULTURAL LANDS.

5.2.1.1.1. Significance. Approximately 158,500 acres are classified as farmland in government jurisdiction (land capable of being farmed) in East Baton Rouge Parish. A large portion of this is prime farmland. Prime, unique, and statewide or locally important farmland is protected by the Farmland Protection Policy Act (FPPA). Approximately 129,500 or eighty-one percent of the acreage noted is defined as farmland by the FPPA. Crops grown are soybean, corn, wheat, and pasture for cattle. The use of cleared land for agricultural purposes in the study area is continually declining as urbanization of Baton Rouge and the surrounding communities proceeds. Value of these lands is based only in part by their ability to produce a crop, but is most heavily based upon their potential for development into economically higher uses. Agricultural land has value for some forms of wildlife, but because of the regional abundance, that value is not considered significant in this study area.

5.2.1.2.1. Effects of No Action. Acreage of open and agricultural lands including prime and unique farmlands would decline as the development and zoning of the city continues. The trend of rapid conversion of cleared agricultural lands for urban and industrial use as occurred from the late 1950's through the early 1980's is not expected to continue, but will instead be replaced by a reduced rate of conversion. Projections of land use changes in the Amite River Basin were made by the Louisiana State Planning Office (LSPO) and are included in the report within Appendix B. The Jones Creek watershed is in the area described in that report as the Urban portion of the basin. Agricultural land is projected to decline due to development at a rate of approximately 3.48 percent per year in that area. The only components of the mitigation area that are in land zoned as agricultural are located in the Northeast portion of the parish. Agricultural land is projected to decline due to development at the low rate of 0.0634 percent per year in the Northeast portion. Although a decline in agricultural land is projected in the overall Jones watershed as well as the others, the exact area of potential project impact of prime and unique farmland for both construction and mitigation measures for project analysis purposes is projected to remain the same with no Federal action as currently exists.

5.2.1.2.2. Effects of Plan JCCL-P1. The construction of flood control features would result in no losses to this resource. The implementation of the combined mitigation plan (from all watersheds) would result in the conversion of approximately 282 acres of land zoned as prime and unique farmland use to wooded lands protected from any future agricultural crop production. An additional 115 acres of agricultural land would be converted by the combined mitigation plan, but that tract is not zoned as prime or unique farmland. Implementation of this alternative would consist of the conversion of prime and unique farmlands equal to approximately 25 percent of the combined mitigation plan

conversion. A request was made to the local representative of the Soil Conservation Service (SCS) regarding the effects of the project (including this alternative) upon landowners relative to the swampbuster provisions of the Food Security Act of 1985. The response received was negative as to any effect (see Appendix E, Section 6 for the Soil Conservation Service letter). The socio-economic effects of producing a commodity crop on those lands, if any may exist, are described in Paragraph 5.2.1.10.8. The analysis of the effects of the project (including the percentage made up by this alternative) relative to the FPPA is also included in Appendix E, Section 6.

5.2.1.2.3. Effects of Plan JCCL-P3. This alternative would result in similar effects as the previous plan, except implementation of this alternative would consist of the conversion of prime and unique farmlands equal to approximately 17 percent of the combined mitigation plan conversion.

5.2.1.2. BOTTOMLAND HARDWOOD FORESTS.

5.2.1.2.1. Significance. Forests of the overall study area (East Baton Rouge Parish) are made up of both natural forest communities and include some introduced ornamental plantings in the urban areas. Approximately 112,222 acres of the area were in forests in 1985 (see Table 5.2.1.2.1.). The term mixed hardwood is the local descriptive term for these lowland forests. The term bottomland hardwood is ecologically and physiographically correct for these forests, however, and is applicable to streambottom forests of the southeast that also contain associated loblolly and spruce pines (Whorton et al., 1982). Much of the forests in the study area are located on the Pleistocene terrace rather than on the alluvial floodplain. Within this natural forest is an area described by the Louisiana Natural Heritage Program as the Prairie Terrace Loess Forest community, which occurs on the terrace formation (see letter from the Louisiana Natural Heritage Program in Appendix E-4). However, this description does not remove this community from the overall bottomland hardwood category. Lowland forests intergrades into a beech-magnolia community on narrow ridges. Spruce pines are generally scattered to common on lowlands along the Comite River and are common to abundant along the Amite. Bottomland hardwoods of lower sites and including species that tolerate wetter conditions are common on the alluvial floodplain.

Some overstory hardwood species of the riparian and beech-magnolia community includes black willow and river birch (immediately adjacent to or within the banks of streams), as well as sweetgum, blackgum, water oak, cow oak, southern magnolia, American beech, white ash, yellow poplar, and red maple. Midstory and understory species include ironwood, eastern hopbornbeam, arrowwood, bigleaf snowbell, silverbell, sweetleaf, and sourwood. These plant communities commonly occur on Cascilla and Ochlockonee soil associations (Dance et al., 1968), which are silt loam and fine sandy loam overflow soils that are naturally flooded once or twice each year, but are well-drained. There are

hardwood forests occurring in the affected area that tolerate more prolonged flooding. These contain a much greater percentage of water oak, cow oak, and sweetgum in the overstory, with poison ivy as a common understory species. This forest type is typically found on Oliver-Calhoun-Loring soil associations and the Calhoun-Zachary-Frost associations. These soil associations are dominantly level, generally poorly drained to moderately well drained and occur on broad flats and in slight depressions. These forests clearly resemble the bottomland hardwood forests of the Mississippi Alluvial Valley. Forests occurring on soils between these conditions contain species of both upper and lower zones.

Forested lands within the overall region have value as timber resources. Even within the parish of East Baton Rouge the average annual removal for all species of growing stock for the period of 1974 through 1980 was 5.3 million cubic feet and for sawtimber was 25.0 million board feet (Thomas and Bylin, 1982). Processing markets are readily available for forest products either within, or in the proximity of, the study area. However, forestlands in the specific possible impact area (adjacent to the channels) have little value as timber resources since they are in such an highly urbanized area.

Some forestlands of the area are considered to be wetlands. Factors that identify areas as wetlands are hydrophytic vegetation, soil classification of hydric, and wetland hydrology. Wetland hydrology is a term used to describe the presence of permanent or periodic soil saturation for a significant period (normally a week or more) during the growing season. Areas adjacent to the Comite and Amite Rivers frequently are inundated by flooding during the growing season. However, the rise and fall of these rivers is a rapid process with out-of-bank flows commonly returning back to the rivers after the second day. Soils of the adjacent areas are typically coarse grained and are not known for their moisture retention capabilities. There are depressional areas or flats in the basin, however, where fine-grained soils are more prevalent. These soils are more likely to stay saturated for longer periods after significant storms. Wooded wetlands such as the depressional areas described above have functions of groundwater recharge, floodwater retention, habitat for fisheries, recreation, and others. However, the function considered most significant in these areas is wildlife habitat value. The goal of "no net loss" of wetlands is applicable to this portion of this resource category. The tables included in the land use resource category of this and other watersheds in this report include a category of wetlands. Baldcypress and/or tupelogum swamps make up the wetlands in these tables.

The habitat provided by bottomland hardwood forests is considered to be most significant of any habitat type of the area. Bottomland hardwood soils provide high fertility, readily available soil moisture, and associated high vegetative productivity. These forests are highly productive in wildlife carrying capacity because of these factors. Bottomland hardwood areas receiving winter inundation are utilized by migratory puddle ducks generally because of the acorns available but also because of the invertebrate fauna that

occurs in abundance in leaf litter on the wet forest floor (Hubert and Krull, 1973). Fredrickson (1980) reports that natural wooded wetlands provide protein sources that have a diversity of amino acids that are common to wood duck eggs. The value of bottomland forests to waterfowl species is affected by the amount of winter flooding. Increased flooding results in increased habitat value for waterfowl. Other wildlife species of bottomland hardwood forests, for which there is significant concern as game animals, include white-tailed deer, gray squirrel, swamp rabbit, raccoon, and wild turkey. In addition to raccoon, other furbearers include mink, Virginia opossum, red fox, and gray fox. Numerous passerine birds are found in this habitat while raptors such as barred owls, screech owls, and red shouldered hawks are common.

Lands adjacent to streams are described as riparian zones. The width of a riparian zone is very arbitrary in a forested area, but for the purpose of this study is considered to be 300 feet. The 300-foot width is the width used as an evaluation parameter in the United States Fish and Wildlife Service (USFWS) Habitat Suitability Index Model: North American Mink (Allen, 1986). Wooded riparian zones of the study area provide an especially valuable habitat to an abundance of animals because of the diversity of forest and shrub vegetation in the near proximity to flowing water. Most animals require access to water for survival even though they may spend most of their time elsewhere. The riparian zone provides protected access to water (Martin and Allen, 1988). Many small mammals, reptiles and amphibians are restricted to the riparian zone. Because of the abundance of insects, open areas for feeding and woody cover, forested riparian habitat provides vital nesting and feeding habitat for songbirds (Stauffer and Best, 1980). Population densities of birds breeding in riparian habitats are exceptionally high (Brinson et al., 1981). Migratory birds rely on riparian habitat to provide protection from predators and cover from the elements. Riparian ecosystems support a greater diversity of wildlife than non-water-related habitats (Brinson et al., 1981). Riparian vegetation provides the bulk of food, cover, and nesting habitat for much of the wildlife in the study area (Nunnally and Shields, 1985). Forested riparian zones are important in maintaining gene flow between wildlife populations because they are used as travel corridors for animals moving between forested tracts that otherwise would be separated by open areas. Wooded riparian areas also provide esthetically pleasing green areas in an otherwise agricultural and urban landscape.

Forested riparian areas also have high value in the maintenance of warmwater stream productivity. Adjacent and overhanging trees provide shade so that lower water temperatures and higher dissolved oxygen levels are maintained during critical hot weather periods. Forested riparian areas provide leaf litter which is the principal source of organic input to the aquatic system. Fallen trees and branches provide practically the only source of instream cover that exists. Riparian vegetation also retards bank erosion, retains flood waters, and filters sheetflow, thereby minimizing turbidity and detrimental excess nutrient inflow. The significance of riparian zones has been documented in numerous publications

(Teskey and Hinckley, 1977; Johnson and McCormick, 1978; Warner, 1979; Stauffer and Best, 1980; Brinson et al., 1981; Johnson et al., 1985; USDA Forest Service, 1987). The U.S. Congress recognized the value of riparian zones in the Wild and Scenic Rivers Act in 1968 which affords protection to rivers and their immediate environment. The Louisiana Legislature passed the Natural and Scenic Streams Act in 1970 to provide a mechanism for protecting rivers and adjacent riparian areas.

Forestlands of the study area also have high value from the visual perception of citizens of the urban area. Wooded areas provide living relief from the noise, congestion, and mechanization of the city. Wooded areas provide shade and relief to the citizenry from intense summer heat. Wooded areas provide the habitat including edge habitat for urban wildlife, the sights of which is enjoyed by residents and visitors to the city alike. Urban wildlife include species such as mockingbirds, brown thrashers, loggerhead shrikes, bluebirds, cardinals, jays, different species of woodpeckers, gray squirrels, and cottontail and swamp rabbits. Urban wooded areas serve as points of educational and scientific interest, especially for students in elementary grades, but even for higher grades and college-age students. Wooded strips serve as shields from objectionable views and also effectively serve as boundaries between properties and neighborhoods. Residential property values are often significantly enhanced when trees or wooded areas are present on the site. The International Society of Arboriculture (1979) presents a methodology for valuation of urban trees. This method produces values of individual urban trees at $18.00 per square inch of trunk caliper (diameter) resulting in values of $905, $1,413, and $2,036 for trees of eight, ten, and twelve inches, respectively, of trunk caliper.

5.2.1.2.2. Effects of No Action. The overall Jones Creek watershed is in an area of relatively fast development and is in the area described as the Urban portion of the parish (see land use analysis in Appendix J). The remaining watersheds discussed, Ward Creek, Bayou Fountain, Beaver Bayou, and Blackwater Bayou are in the Urban, Southern, Northeast, and Northwest portions, respectively. Table 5-2-1-2-1 presents past and projected acreage in forest land in the portions and the total of the parish. Although there is a trend of conversion of agricultural land to forested land throughout the region, this is not true for the study area due to the urban nature. Forested lands are being developed or converted to other uses at an annual rate of -2.2996 percent in this portion of the parish. The effects of no action to the wildlife species occupying that entire potentially impacted area are directly related to the changes in acres of that resource. The present and future amount of flooding to woodlands would result in little change to the existing very limited value to waterfowl in this urban area. Although a decline in forested land is projected in this overall watershed as well as the others, the area of potential project impact would not experience the same rate of conversion since it is contiguous to the existing channel. The development rate of the exact area of potential project impact is projected to maintain, with no Federal action, approximately 20 percent of the development rate of the remainder of the area.

TABLE 5-2-1-2-1
PAST AND PROJECTED FOREST ACREAGE
BY YEAR IN AREAS OF EAST BATON ROUGE PARISH [1]

Year	Urban	Northwest	Northeast	Central	Southern	Total
1978	10,316	28,603	53,579	11,703	14,105	118,306
1985	7,608	28,896	53,157	11,550	11,011	112,222
2040	3,061	27,739	52,596	10,548	2,711	96,655

[1] From Appendix J, Land Use Analysis

5.2.1.2.3. Effects of Plan JCCL-P1. Approximately 78 acres of wooded lands would be lost due to project construction measures. Habitat units lost due to project construction utilizing the U.S. Army Corps of Engineers Habitat Evaluation System (HES) would be 44 annualized habitat value (HUVs). A complete analysis of the HES evaluation and recommended mitigation is included in Appendix E, Section 1. Lost habitat value is fully compensated with the offsite mitigation measures implemented according to the HES. There would be no net loss of habitat value. The habitat losses and the recommended mitigation utilizing the U.S. Fish and Wildlife Service Habitat Evaluation Procedures (HEP) for this and all other watersheds are displayed in Appendix F. The evaluation was done only for the Tentatively Selected Plan for each watershed in the HEP. A total of 67.40 average annual habitat units (AAHU's) would be lost for all evaluation species as determined by the HEP for this alternative. Analysis of land use and stage frequency data for this and all other watersheds of the entire study area revealed that the impacts of stage reductions to the limited amount of wintering waterfowl habitat of this urban area were insignificant. The amount of forested wetlands upon which flooding would be reduced by this alternative, as well as any other action alternative of this or any other watershed, would be minimal in this urban area. The effects of visual losses of these resources are covered in the paragraphs on aesthetics. The location of the habitat mitigation sites adjacent to existing public use parks within the parish as possible will allow the public to benefit from those areas for nature enjoyment, scientific study, and diversity of land use. Loss of the value of individual trees to residents can be minimized if construction is conducted with a concern for minimization of those losses. Increased urban growth with some associated conversion of wooded lands may be an indirect effect of the proposed action.

5.2.1.2.4. Effects of Plan JCCL-P3. Implementation of this alternative would be very similar to Plan JCCL-P1. However, approximately 52 acres would be impacted by construction measures with a corresponding habitat loss of 29 HUVs. The offsite habitat mitigation plan developed would fully offset those habitat losses.

5.2.1.3. THREATENED AND ENDANGERED SPECIES

5.2.1.3.1. Resource Significance. Letter requests were made early in project design to the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) to determine if any listed threatened or endangered species or any species proposed for such listing occur in the study area. A similar request was also made to the Louisiana Natural Heritage Program (LNHP) for information on species of their concern. All of the agencies responded. Pertinent correspondence is included in Appendix E, Section 4. The NMFS replied initially with a list of species that may occur in the marine environment off coastal Louisiana. A responding letter sent by the District explained more specifically the location of the proposed work in relation to the marine environment and made the determination that the work would not effect the continued existence of any of the species listed in their initial letter. A subsequent letter received from the NMFS agreed with the determination that populations of endangered species under their purview would not be adversely affected by the proposed action.

A request was made in later stage project design to the USFWS explaining in more detail the kind and extent of proposed modifications. The USFWS did express a concern for the inflated heelsplitter, a threatened species, in the Amite River, and the bald eagle. However, due to the limited amount of work on the lower end of Jones Creek, they acknowledged that they anticipate no adverse affect to the inflated heelsplitter as a result of the proposed work. The USFWS mentions the concern for the bald eagle. A nest is in the vicinity of Bayou Fountain but has not been used since the 1990 nesting season. However, abandoned nests are monitored for five years after last known use. No mention was made of eagles nesting in any other watershed.

The LNHP replied early in project design that a significant natural habitat occurs on one of the watersheds, Ward Creek, on the Louisiana State University (LSU) Burden Research Plantation. They stated that the area is a virgin or old-growth Prairie Terrace Loess Forest that is currently registered with the Louisiana Natural Areas Registry Program (see Appendix E, Section 4).

The inflated heelsplitter, Potamilus inflatus, is a freshwater mussel, the existence of which is reportedly threatened by gravel dredging, flood control, and navigation interests. Stern (1976) reports the preferred habitat of the inflated heelsplitter is soft, stable substrates in slow to moderate currents. Hartfield (1988) reports it has been found in sand, mud, silt, and sandy-gravel, but not in large gravel or armored gravel. It is usually found on the protected side of bars and may occur in depths of over 20 feet. Limited amounts of siltation may suffocate juveniles whereas adults could survive. Historically, the heelsplitter occurred in the Tangipahoa River as well as the Amite River in Louisiana. It has not been reported from the Comite River. It also occurred in the Pearl River in Mississippi as well as the Tombigbee, Black Warrior, Alabama, and Coosa Rivers in Alabama. Recent

surveys indicate the heelsplitter is no longer found in the Alabama River, nor in the Coosa River, although the original records within the Coosa have been doubted. Also, the heelsplitter is no longer found in the Tangipahoa and Pearl Rivers. Populations within the remaining rivers have been much reduced. Listed species are accorded protection under the Endangered Species Act and are subject to its provisions, including Section 7.

The bald eagle, Haliaeetus leucocephalus, is a migratory raptor typically found in coastal areas or adjacent to lakes or rivers in Louisiana. Nesting in the South occurs from October 1 through May 15. Nests are found in large, prominent trees with tops sufficiently large to support nests of sizes that may reach as much as twelve feet in height and eight feet in width. A nesting territory is made up of the nest tree and several perch trees that may be located as much as one-quarter mile away from the nest tree. Tolerance to disturbance is least during egg laying, incubation, and the first several weeks after hatching. Fish is a favored food of eagles but waterfowl, typically coots in Louisiana, make up a large portion of the diet also. It is noted that the nest that was found is not in the Jones Creek Watershed.

5.2.1.3.2. Effects of No Action. Since the NMFS has indicated no species under their purview would be adversely effected by the proposed action, no further comments are appropriate regarding those species. However, the threatened status of the inflated heelsplitter indicates that activities in areas where these creatures exist may be causing a decline in populations. A definite statement, however, of whether this species would or would not be present for the next 50 years cannot be made with any degree of accuracy. The most limiting factor to the existence of the heelsplitter is the amount of activity of any action that abruptly cuts away or buries heelsplitter colonies in the Amite River. Naturally occurring transport of sediment caused by unrestricted flows including flood flows is evidently a necessary factor to the existence of the heelsplitter mussel. The current sediment transport capacity for the one-year event and the five-year event of 16,000 and 430,000 tons per day, respectively, on the Amite River near Bayou Manchac would be maintained. The remnant old-growth forest mentioned by the LNHP would probably be left intact since it receives a considerable amount of protection by being on the property of the LSU Research Plantation. However, this forest is limited to the Ward Creek watershed only. The eagle nest may not be used again if the use in recent years can be used as an indicator of future use.

5.2.1.3.3. Effects of Plan JCCL-P1. The eagle nest, and thus the nesting bald eagles, would not be affected by any plan since the nest is not located in this watershed. Implementation of this or any other alternative would result in essentially the same effects. Overall, the proposed channel improvements would not result in a reduction of flood runoff volume. Also, the frequency of peak discharges would remain essentially unchanged. The proposed improvements would affect conveyance. Concrete lining would increase conveyance, but would greatly reduce the source of sediment to be transported.

Bank erosion would be significantly reduced throughout a large part of the Jones Creek watershed; therefore, the amount of transported material would be minimized. Some erosion would still occur on the lower section of Jones Creek immediately below Jones Creek Road; however, erosion is not nearly as pronounced in that segment as in upstream segments of the watershed. The backwater effects of the Amite is a major factor influencing stages, conveyance, and sediment deposition at this area. The actual construction of the concrete lining or the actual clearing and snagging work, however, would result in immediate increases in turbidity levels during construction on the downstream segments that could be evident even in the Amite River at some times. Once within the river, the flows of the Amite would rapidly move any remaining sediment introduced by Jones Creek. In summary, it is anticipated that there would be little change in the transport capacity of the lower segment of Jones Creek near the Amite River. Furthermore, the transport capacity of the significantly larger Amite River is more than adequate to move any introduced materials without any anticipated adverse effects such as quick release of particles from suspension in the river and, thus, possible suffocation to the heelsplitter.

5.2.1.3.4. Effects of Plan JCCL-P3. The effects of this alternative would be very similar to the effects of the previous alternative but less pronounced since no work would be included on the tributaries.

5.2.1.4 AQUATIC RESOURCES

General. For the purpose of this document, aquatic resources of the study area are separated into water quality and ecological features.

5.2.1.4.1. Water Quality Features

5.2.1.4.1.1. Significance. The project streams located in the study area are not specifically listed in Louisiana's water quality standards. However, as they are all either tributaries, distributaries or interconnected streams of the Comite and Amite Rivers they all have primary contact recreation, secondary contact recreation and propagation of fish and wildlife as their designated water uses. No segments of the project streams, the Comite River or the Amite River in the study area are designated as outstanding natural resource waters. In 1988 the Louisiana Department of Environmental Quality (LDEQ) assessed the Comite River, from the entrance of White Bayou to the Amite River, as partially supportive of its designated water uses. This assessment was based on information other than current site-specific ambient water quality data, such as direct observations and general knowledge of the waterbody, location of pollution sources, citizen complaints, fish kill investigations, fishing success, and short-term intensive surveys and fisheries surveys. The LDEQ also assessed the Amite River, from La. Hwy. 37 to the Amite River Diversion Canal, as partially supportive of its designated water uses. This assessment was based

solely on current site-specific ambient water quality data. Dissolved oxygen concentrations and fecal coliform counts were the primary parameters of concern in this assessment.

Lake Maurepas, the eventual receiver of all waters from the East Baton Rouge Parish area, also has primary contact recreation, secondary contact recreation and propagation of fish and wildlife as its designated water uses. Based on information other than current site-specific ambient water quality data, the LDEQ has assessed Lake Maurepas as fully supportive of its designated water uses.

5.2.1.4.1.2. Effects of No Action. There is no indication that the water quality of the Comite River, Amite River, Lake Maurepas, or any of the East Baton Rouge Parish watersheds would worsen without the project. In fact, it seems that the water quality of the aforementioned waterbodies would improve as a result of the implementation of the best management practices as set forth in the Louisiana Water Quality Management Plan. Implementation of East Baton Rouge Parish's plan to divert a large portion of the municipal waste that is currently being discharged into tributaries of the Amite River into the Mississippi River would also improve the water quality in the aforementioned waterbodies.

5.2.1.4.1.3. Effects of Plan JCCL-P1. Both concrete lining and also clearing and snagging of channels are used to increase stream capacity for flood control. The impacts of concrete lining may be similar, but are much greater than those resulting from clearing and snagging. Stream bottoms and side slopes must be denuded of all vegetative materials to begin the work. Concrete surfaces leach out chemical substances. Mostly carbonates and hydroxides of calcium and magnesium come from cement mixing operations and from the cement itself. Although the greatest amount of leaching occurs during and immediately after construction, long-term leaching undoubtedly takes place.

Construction activities such as site preparation, development of access routes, and actual excavation causing the suspension of bottom sediments would result in increased turbidity levels in the above streams. The removal of any shading stream bank cover would elevate the temperature of the streams. Depressed oxygen levels would likely occur as the result of disturbing unoxidized bottom sediments having high chemical and biological oxygen demands, although the extent of reduced oxygen levels would largely depend on the nature of the disturbed sediment. Elutriate analyses indicates that there would not be any significant adverse water quality impacts associated with the resuspension or redissolving of heavy metals in the stream bed materials. No significant differences in nutrient and contaminant fecal levels are expected because these levels are usually related to types of land use and their distribution within the drainage basin. These impacts are temporary in nature and would diminish soon after the completion of the project. By and large, especially at times of moderate to high flows, channel improvements facilitate water flow and flushing. As a result of the increased assimilative capacity of the stream, the water

quality with respect to many parameters, and particularly dissolved oxygen content, may increase after the channel improvements. Also, clearing and snagging may remove many problem materials, thus speeding up the recovery time of a stream. This plan should not have any significant long-term impacts on Lake Maurepas. Short-term turbidity increases are expected in the Amite River. No adverse water quality impacts are anticipated as a result of any tree plantings or bike path on Jones Creek. In fact, any tree plantings on the streams would have positive water quality impacts, such as providing shade cover for the streams, preventing soil erosion and contaminant leaching from surface runoff into the streams, and precluding future development adjacent to the streams.

5.2.1.4.1.4. Effects of Plan JCCL-P3. The effects of this plan are similar to, but less adverse than Plan JCCL-1, since no construction would be conducted on any tributaries of Jones Creek.

5.2.1.4.2. Ecological Features

5.2.1.4.2.1. Significance. The watercourses of the area have limited significance from an ecological standpoint. Since their main function is conveyance for urban runoff, their ecological significance is simply because of their contribution to downstream habitats and not because of their high habitat value . Virtually all of the streams and channels in the area have been altered by prior enlargement or clearing and snagging activities. Woody vegetation has been removed from the side slopes in most portions within the heavily urbanized areas. Benthos is made up of organisms that can exist in bottoms of very low dissolved oxygen. Consequently, those habitats definitely do not support a significant population of harvestable sized sport or commercial fishes. However, those areas do support sufficient numbers of minnows, mosquitofish, and other forage species to provide food for other fishes higher up the food chain and for wading birds. The lowermost portion of Jones Creek (or any other stream) where the backwater effects of the receiving stream or river is most prominent, is the most valuable portion from a fisheries population standpoint.

5.2.1.4.2.2. Effects of No Action. This stream and its tributaries provide rather poor habitat. Since the entire input to the stream is urban runoff, and development is still occurring, any change would likely be a decline in aquatic habitat value. The lowermost portion in the proximity of the Amite River would continue to be heavily influenced by backwaters conditions of that watercourse. Channel banks would continue to be maintained by cutting of small trees with application of stump killers and by application of herbicides to the side slopes. The establishment of a native bermudagrass slope lining is the intended goal of the program. Expansion of the program is projected, therefore, native bermudagrass as well as some other resistant grasses would continue to survive. Tolerant minnows as well as other species inhabiting waters with low dissolved oxygen content would continue to survive.

5.2.1.4.2.3. Effects of Plan JCCL-P1. This plan consists of clearing and snagging of the lower 3.4 miles of Jones Creek and concrete lining of approx 16.3 miles of channels on Jones Creek and its tributaries. Concrete lining would initially provide an essentially barren substrate with nothing for burrowers to inhabit. However, after several rains sediments would accumulate and would then begin to provide a substrate sufficient for limited development of some benthic organisms. These organisms would not likely be of the type utilized by commercially important fish, but rather would be of the type tolerant to prolonged periods of low dissolved oxygen. The leaching of carbonates and hydroxides from calcium and magnesium from the concrete may restrict the development of organisms for some time but this would become more and more minimal with time. The forces of passing floodwaters readily removes easily erodible materials from concrete surfaces. Clearing and snagging would remove all accumulated obstructions including sediment accumulations at certain locations and would result in areas of denuded channel banks and channel bottoms. Trees would be cut and removed to the top of the bank line. The removal of the cover of grasses from channel slopes would allow unfiltered runoff and erosion from side slopes. However, post-construction grass plantings on those side slopes and top of bank would quickly minimize those impacts. The removal of snags where they occur would remove some diversity; however, very little exists in the area at present. Turbidity and instream temperatures would be increased as a result of clearing and snagging, but this would have little significant impacts on the fishery that is so degraded now. Aesthetic mitigation measures consisting of plantings of trees and shrubs in selected areas could eventually result in a band of adjacent trees along those portions of the channel where right-of-way is sufficiently wide to allow planting. From an ecological standpoint it would create shade, reduce water temperatures, and produce organic matter for input into the watercourse. This good type of organic matter rather than "poor input" (referring to runoff from lawns and industrial areas) would be a change to the source of productivity of the stream and the entire downstream system. Additionally, the off-site wildlife habitat mitigation measure for this alternative of reforestation of a designated acreage of open lands would provide a more desired source for runoff when considering the source of waters for this resource, than would lands in a cleared condition in the mitigation area. In sum, the implementation of this alternative would result in a negligible negative effect on aquatic productivity over the no action alternative when considering the entire length of the affected watercourse and the runoff from the mitigation area. Aquatic resources downstream of the construction area may receive higher water volumes and possibly higher stages over a reduced period during and immediately following very localized storms. When more widespread storms have resulted in higher stages in the receiving waters those effects would be less pronounced.

4.2.1.4.2.4. Effects of Plan JCCL-P3. This plan would consist of concrete lining and clearing and snagging, but would be confined to Jones Creek only. Approximately 3.4 miles would be cleared and snagged (as with Plan JCCL-P1) and 9.0 miles would be concrete lined. The overall effects of this alternative would be very similar but would be

less significant than the effects of Plan JCCL-P1. The benefits of mitigation measures would be similar to the previous plan.

5.2.1.5. CULTURAL RESOURCES

5.2.1.5.1. Significance. Channel maintenance or modification by non-federal entities has been conducted along virtually all of Jones Creek as well as the tributaries, Lively Bayou and Weiner Creek. The extent of these impacts was documented during a literature and records research coupled with reconnaissance fieldwork by Goodwin et al. (1990). This research was conducted as part of the current feasibility study. Louisiana State Site Records indicate there are three sites which may be located within the project area. Two of these (16EBR13, 16EBR26) have not been assessed in terms of their National Register significance. The Addison site (16EBR27), was reported to have been destroyed during the construction of Interstate 10 and is not significant (Goodwin et al. 1990).

5.2.1.5.2. Effects of No Action. Channelization, enlargement, and construction within the project area is likely to continue as urbanization continues. It appears unlikely that significant cultural resources will be encountered due to impacts already sustained to the project area.

5.2.1.5.3. Effects of Plans JCCL-P1 and JCCL-P3. The proposed plan for the project area consists of clearing and snagging the downstream segment of Jones Creek from its mouth to Jones Creek Road and widening and lining the upstream segment of Jones Creek and its tributaries. These tributaries consist of Weiner Creek, Lively Bayou and an unnamed tributary.

Investigations conducted during the feasibility study indicate that channel maintenance or modification has impacted virtually all of the project area (Goodwin et al. 1990). No further survey is planned in the project area. The State Historic Preservation Officer (SHPO) has been informed of the decision. Previous investigations have identified three archeological sites in the project area: 16EBR13, 16EBR26, and 16EBR27. Site 16EBR13 is located in the downstream portion of Jones Creek. Plans for clearing and snagging for this segment will not impact the site. The Palmar site (16EBR26) is described as an prehistoric midden, that may have been redeposited with other dredged material during previous channel maintenance. The site could be impacted by channel widening which is planned on Lively Bayou. Both 16EBR13 and 16EBR26 have not been assessed in terms of their National Register significance. Previous channel improvements appear to have impacted both sites and they are not expected to possess the quality of significance necessary for inclusion on the National Register. The Addison Site (16EBR27), was reported destroyed by highway construction by Goodwin et al. (1990). Therefore, no further work is required at this site. The SHPO has been informed of these recommendations (Appendix G).

5.2.1.6. RECREATION RESOURCES

5.2.1.6.1. Significance. East Baton Rouge Parish has an aggressive recreation program providing recreational sites and programs for urban and rural areas alike. Existing recreational areas in East Baton Rouge Parish include numerous local parks, neighborhood playgrounds, country clubs, a zoo, state commemorative areas, etc. The Recreation and Parks Commission for the Parish of East Baton Rouge (BREC) in their most recent reporting year (1992), reports 136 BREC facilities on a total of 3,840 acres. Attendance at these sites is estimated at 8,309,801 annually. Many programs were expanded and new programs were added by BREC. Improvement include an Art Gallery at City Park, 15 new centers, 26 new day camps, the Velodrome bike facility, a horse activity center, the fairgrounds, Highland Road tennis center, and many others. Golf courses within the BREC system registered 200,000 rounds of golf played in 1992. The Greater Baton Rouge Zoo experienced a total of 345,193 visitors as it observed its 20th anniversary. All of the 132 tennis courts were highly utilized with annual tournaments being held at most of the tennis centers. Other popular activities offered at BREC facilities include women's co—ed sports, basketball, baseball, football, and fun runs. BREC parks are generally located in neighborhoods within walking or biking distance from most of the potential users. These parks are equidistant from each other providing the opportunity for high neighborhood utilization. Few formal bicycle riding trails exist within the parish. Approximately 4.5 miles of Class I bikeways and 5.2 miles of Class II bikeways are present in East Baton Rouge Parish. Class I bikeways are bikeways which have a separate path for the exclusive use of bicycles. Class II bikeways generally consist of a shoulder of a roadway designated for preferential or exclusive use of bicycles.

5.2.1.6.2. Effects of No Action. The no action alternative would not impact existing or future recreation planned within East Baton Rouge Parish. However, population expansion in Baton Rouge would, in time, overload existing recreation facilities requiring additional park development to satisfy the greater demand. The Horizon Plan, a comprehensive land use plan developed by the East Baton Rouge City Planning Commission, and long range plans of BREC identify substantial recreational improvements, including bike trails, parks, and other features for future development.

5.2.1.6.3. Effects of Plan JCCL-P1. Implementation of the recreation development plan associated with this alternative is projected to provide approximately 45,000 bicyclist user days annually.

5.2.1.6.4. Effects of Plan JCCL-P3. The effects of this alternative would be similar to the previous alternative. However, since no work would be done on the tributaries, total miles of paths constructed would be reduced, and user days would not be as numerous.

5.2.1.7. AESTHETIC RESOURCES

5.2.1.7.1. Significance. Within East Baton Rouge Parish vegetation existing along the various drainage corridors provides a variety of aesthetic and ecological benefits. Erosion control, wildlife benefits, improvement of air quality and providing a scenic buffer zone, are positive attributes attributable to these vegetative linear green spaces. Vegetation existing along the stream banks also contributes to erosion control. The natural vegetative growth of horizontal root systems limits bank erosion and contributes to stable banks. The existing stream bank vegetation provides wildlife and bird habitats. In a world of concrete, gas fumes, industrial corridors, and shopping centers, the sightings of native birds and ground-dwelling wildlife is quite unique for a city. These green stream bank corridors provide nesting and feeding areas for native fauna. These stream corridors increase the abundance and diversity of wildlife in the city contributing to an overall aesthetic neighborhood experience. Another advantage of greenway corridors in the city is the reduction in pollution, creation of shade, and, thus, cooler spaces. In summer, shaded vegetated stream bank areas can be as much as ten degrees cooler than non-shaded areas. Air currents moving through the city over forested areas results in cooler air and lower humidity. Preservation of natural areas where trees and native shrubs are allowed to flourish assures that the associated aesthetic conditions are maintained. Greenways along stream banks provide a buffer zone decreasing the nuisance of lights, noise, visual unsightliness, etc., from the view of adjacent residents. Throughout the city, greenways screen non—compatible use from aesthetic degradation by providing a spacial separation between areas of different use within the city and by strengthening neighborhood identities.

5.2.1.7.2. Effects of No Action. Urbanization would continue to slowly diminish the remaining green spaces including those along the watercourses within the city. The demand for those areas would increase as the extent is diminished.

5.2.1.7.3. Effects of Plan JCCL-P1. Approximately 78 acres of wooded stream banks would be lost. Visual degradation would occur through the project loss of overstory hardwood trees of the beech—magnolia type such as sweetgum, blackgum, water oak, cow oak, southern magnolia, American beech, white ash, yellow poplar, and red maple. Midstory and understory species lost include ironwood, eastern hophornbeam, arrowwood, bigleaf snowbell, silverbell, sweetleaf, and sourwood. Removal of these trees along the upper stream bank corridor would delete the privacy and enclosure created by their presence. Trees adjacent to the stream provide aesthetic benefits to adjacent landowners. The removal of the stream bank riparian habitat and the associated wildlife would cause a corresponding loss to the overall aesthetic appeal.

The aesthetic mitigation plan consists of the planting of approximately 4.25 miles of trees and shrubs along the channel. The plan would return the lost green space, extensive screen of trees and shrubs, and rural feeling to this urban area (see Appendix E, Section 2).

Additionally, those trees planted as part of the recreation development plan would also add aesthetic appeal and shade to the bike path (see Appendix E, Section 3).

5.2.1.7.4. Effects of Plan JCCL-P3. Implementation of this alternative would be very similar to Plan JCCL—P1. However, aesthetic losses would be less since only 52 acres of stream bank vegetation would be lost. Therefore, less revegetation through new trees and shrubs would be needed.

5.2.1.8. NOISE.

5.2.1.8.1. Significance. Noise can be defined most simply as unwanted sound or sound in the wrong place at the wrong time. Noise can also be defined as any sound that is undesirable because it interferes with speech and hearing, is intense enough to damage hearing, or is otherwise annoying. Noise levels in the effected area are typically low in subdivisions and in outlying areas and are higher in the proximity of major streets and highways. The ambient dBA level in an urban residential community has been determined by the Environmental Protection Agency (EPA) to be 60. The ambient noise along a major traffic corridor would be higher, possibly to 70 dBA. East Baton Rouge Parish has established criteria or standards for environmental noise and has enacted them as a City/Parish ordinance. Maximum permissible noise levels measured in dBA (decibels) are listed in Sec.12:102 of that ordinance for different zonings throughout the day. However, an exception to these prohibitions is allowed by Sec. 12:103 (b)(3) which states "Nothing in this chapter shall be construed to prohibit, restrict, penalize, enjoin or in any manner regulate any federal, state or local governmental agency or any employee or agent of the same in the fulfillment of any official duty or activity sanctioned by or on behalf of the governmental agency."

5.2.1.8.2. Effects of No Action. Noise levels in less developed areas would be expected to increase moderately with the projected increase in residential and commercial growth.

5.2.1.8.3. Effects of Plan JCCL-P1 . Noise levels would essentially be increased for all plans during construction due to the operation of equipment. Since the overall area is highly developed, it is acknowledged that project noises would be heard by a large number of hearers both in commercial and residential areas. It is assumed that for this and each other alternative, the construction equipment would operate from 10 to 12 hours per day (depending upon the season), six days per week. Construction is projected to progress from the outlet end of the route to the inlet end. Noises associated with excavation and hauling of excavated material would progress gradually down the right-of-way. During certain phases of construction, noise impacts actually would be insignificant for certain periods of time. A decreasing circle of noise would be produced by the equipment as it moves along the construction route. The equipment (dozers, draglines, and hauling trucks) that would be working on the excavation would produce sound levels of approximately 102

dBA at 50 feet, 96 dBA at 100 feet, 90 dBA at 200 feet, and 84 dBA at 400 feet. Any specific location would be exposed to these levels for varying amounts of time. The total duration for project construction is projected to be approximately 72 months, 36 of which is projected for construction on the tributaries of Jones Creek. Therefore, construction noise could be heard at any time during daylight hours during that period. However, the total duration of work includes all activities some of which would be much quieter than the major construction activities. Also buildings and trees tend to restrict the effects of sound; therefore, construction noise may be muffled in some areas. EPA has a limit of 85 dBA for eight hours of continuous exposure to protect against permanent hearing loss. The decibel levels associated with channel construction would be higher than this, but for a relatively short duration; therefore, no hearing impairment should occur. Construction workers would have protective hearing devices. Since construction would take place during daylight hours, sleep interference should occur only for napping children and day sleepers. Noise affects many bodily functions (heart rate, respiratory volume, digestive secretions, hormonal secretions, etc.). If prolonged, the construction noise levels could produce significant physiological damage. However, the relatively short duration of the noise should prevent such problems. The noise would definitely be annoying to inhabitants of all buildings within 400 feet of the actual work site. During the time the noise is higher than 85 dBA, it would be difficult to hold a conversation within structures with little insulation from noise.

5.2.1.8.4. <u>Effects of Plan JCCL-P3</u>. The effects of this alternative would be very similar to the previous alternative; however, the projected duration of construction is 41 months.

5.2.1.9. VECTORS

5.2.1.9.1. <u>Significance</u>. Vectors in the project area include a variety of mosquitoes, the most common genera being <u>Anopheles</u>, <u>Aedes</u>, and <u>Culex</u>. Some species inhabit various habitats while others are more restricted. Some species, such as <u>Aedes</u> <u>solicitans</u>, breed only in temporary water while others, such as <u>Culex</u> <u>salinarius</u>, require permanent water for breeding. The most common vector-borne diseases are infectious equine anemia, anaplasmosis, and Venezuelan equine encephalitis.

5.2.1.9.2. <u>Effects of No Action.</u> No change in the present populations or factors affecting the populations of mosquitoes are projected in the project area. An active mosquito control program is presently in existence and is projected to be continued.

5.2.1.9.3. <u>Effects of All Plans.</u> Implementation of any alternative would result in no projected change in vector populations. Improved channels and adjacent top-of-bank areas would be shaped to eliminate the occurrence of standing water. Depressions made by equipment during construction would provide the potential for development of mosquito

habitat. Current controls should be adequate to maintain populations at desired levels. Control would be necessary if noticeable population increases occurred.

5.2.1.10. SOCIOECONOMIC RESOURCES

The purpose of this section is to describe the more significant social and economic conditions of the area and to identify potential impacts of various project alternatives, including no Federal action.

5.2.1.10.1. Land Use.

5.2.1.10.2. Significance. Table 5-2-1-10-1 shows historical land usage in East Baton Rouge Parish for 1972, 1978, and 1985. Urban land has increased dramatically largely at the expense of agricultural and forest lands.

The demand for urban land has originated largely from the growth of petro-chemical processing industries, deep-water port facilities, the development of state government, increases in higher education, and the need for additional residential developments. The state capitol and the main campuses of Louisiana State University (LSU) and Southern University are located in Baton Rouge.

5.2.1.10.1.2. Effects of No Action. The general effects of no action would include the continued level of flood hazard in the Jones Creek Watershed. Several of the sub-basins in this watershed are virtually completely developed at the present time. The trend of increasing urban growth can be expected to continue in those areas not fully developed

TABLE 5-2-1-10-1
Land Use In East Baton Rouge Parish
(in acres)

	1972	1978	1985
Urban	53,195	79,176	93,054
Agricultural	126,317	92,407	86,660
Forest	82,702	83,088	76,754
Water	1,100	867	1,130
Wetlands	5,357	6,917	6,593
Other	1,049	7,265	5,529
Totals	269,720	269,720	269,720

although probably not at the rate experienced during the late 1970's and early 1980's. Increases in urban land will occur through the continued conversion of agricultural and forest lands, influenced in part by an area's level of flood protection. 1985 land use for the Jones Creek Watershed is shown in Table 5-2-1-10-2. It is noted that the lack of wetlands shown in the table should not be interpreted that there are absolutely no wetlands in the watershed. It means that any wetlands in the watershed are so scattered and fragmented that they could not be picked up in the survey.

5.2.1.10.1.3. Effects of Plan JCCL-P1. The immediate effects of this plan on land use would be a reduction in the current level of flood hazard that threatens developments in the less protected areas of the watershed, primarily, residential developments. There would be no direct changes in land use due to construction.

TABLE 5-2-1-10-2
Jones Creek Watershed 1985 Land Use

Basin #	Urban	Agri	Forest	Water	Wetlands	Other	Total
22	8,272	725	1,703	0	0	30	10,730
23	1,120	0	30	0	0	0	1,150
24	1,969	143	793	0	0	200	3,105
28	1,602	107	61	11	0	48	1,829
Total	12,963	975	2,587	11	0	278	16,814

5.2.1.10.1.4. Effects of Plan JCCL-P3. Similar to Plan JCCL-P1 but with less flood reduction as no improvements are planned for the tributaries.

5.2.1.10.2. Housing.

5.2.1.10.2.1. Significance. Much of the urban land and some of the rural portion of the flood plain are used for residential development. The total number of housing units in East Baton Rouge Parish has increased steadily from 88,959 in 1970 to 133,635 in 1980 to 156,767 in 1990. The 1990 density of 344 housing units per square mile, as expected, is much higher than the state average of 39 per square mile.

5.2.1.10.2.2. Effects of No Action. The effect of no action, or the lack of any other flood control program, would result in the continued periodic flooding of those houses within the watershed that have inadequate flood protection. Recent survey of this watershed indicates

that approximately 1,532 residential structures have floor elevations at or below the current 100-year level of flood protection. Current insurance programs for homeowners encourage new construction to provide greater protection.

5.2.1.10.2.3. Effects of Plan JCCL-P1. Completion of this plan would substantially reduce the threat of flooding within the watershed. With the project in place, the number of residential structures with floor elevations at or below the 100-year level of protection would decline from 1,532 to 36.

5.2.1.10.2.4. Effects of Plan JCCL-P3. Similar to Plan JCCL-P1 but less of a reduction in the threat of flooding, since there is no improvements along the tributaries. This plan would leave approximately 465 residential structures at or below the 100-year level of protection.

5.2.1.10.3. Property Value.

5.2.1.10.3.1. Significance. Property values in East Baton Rouge Parish are influenced by a wide variety of factors, including the level of flood protection. Other factors influencing property values include such things as economic development, urban amenities, access to transportation systems, and proximity to scenic landscapes and recreational opportunities. All other things being equal, the unit values of protected land tends to be higher than unprotected land. This is particularly significant in or around urban developments where a wide variety of interests, both private and public, must compete for a limited amount of land. The potential for expansion in the Baton Rouge urbanized area is restricted by the Mississippi River to the west and south, and by wetlands to the south and east. These factors significantly influence existing and future property values. Table 5-2-1-10-3 shows the assessed valuation of property in East Baton Rouge Parish for the last 10 years.

5.2.1.10.3.2. Effects of No Action. Under no Federal action, the value of property with adequate flood protection in the watershed would tend to increase as the general economy of the Baton Rouge area improves and as the demand for development increased. The value of property without adequate flood protection, however, is unlikely to increase as rapidly and could eventually decline, as developers seek opportunities for investment elsewhere.

5.2.1.10.3.3. Effects of Plan JCCL-P1. The drainage improvements offered by this plan would tend to raise the value of existing developments where the potential for flood damage is the greatest. The value of undeveloped areas would also tend to rise. Concrete lining of the channel will eliminate erosion problems which should also improve property values.

TABLE 5-2-1-10-3
Assessed Valuation of Property
in East Baton Rouge Parish

Year	Value [1]
1979	907.8
1980	975.9
1981	1,035.3
1982	1,295.0
1983	1,337.0
1984	1,404.8
1985	1,509.2
1986	1,549.2
1987	1,545.2
1988	1,500.3

[1] Millions of Dollars.

5.2.1.10.3.4. Effects of Plan JCCL-P3. Impacts to property values would be similar to Plan JCCL-P1.

5.2.1.10.4. Business and Industry.

5.2.1.10.4.1. Significance. Business and industry in the vicinity of Baton Rouge have developed largely by the expansion of port activities, petro-chemical processing plants, and related sales and services. Wholesale, retail, and service industries have been attracted by these basic industries, as well as by the professional and technical needs of state government. Baton Rouge is also the location of the main campuses of Louisiana State University and Southern University. Table 5-2-1-10-4 shows the growth of business and industry in East Baton Rouge Parish.

5.2.1.10.4.2. Effects of No Action. Recent trends and the existing infrastructure suggest an eventual recovery of port activities and potential for continued economic growth, although at rates below those experienced during the rapid expansion of the Gulf Coast's oil boom.

5.2.1.10.4.3. Effects of Plan JCCL-P1. Improved flood protection would reduce physical damages to businesses and industries, as well as reduce possible disruption of normal business activities, with an accompanying income loss.

5.2.1.10.4.4. Effects of Plan JCCL-P3. Impacts would be similar to Plan JCCL-P1.

5.2.1.10.4.5. Employment.

5.2.1.10.4.5.1. Significance. Table 5-2-1-10-5 shows employment and unemployment trends for East Baton Rouge Parish. Employment increased for every year shown except 1983 which was due primarily to the decline in oil production and related petro-chemical industries. Unemployment increased dramatically during the 80's due to the aforementioned oil decline, fluctuations in port activities, and reductions in related services. In 1988, unemployment in East Baton Rouge Parish was about 8.3 percent while unemployment nationwide was reported to be 5.3 percent.

5.2.1.10.5.2. Effects of No Action. Employment is expected to increase as economic conditions improve during the 1990's. The rate of increase should be slightly greater than the populations increase, as a greater number of women join the work force.

TABLE 5-2-1-10-4
Business and Manufacturing Trends
East Baton Rouge

	1967	1977	1982	1987
Manufacturers				
# of establishments	194	291	306	323
# of employees	16,100	17,800	18,300	13,000
Wholesale Trade				
# of establishments	463	655	777	829
# of employees	5,414	8,539	11,101	9,308
Retail Trade				
# of establishments	1,902	2,441	2,850	2,331
# of employees	14,140	23,592	29,515	31,948
Services				
# of establishments	1,411	2,738	(N/A)	3,099
# of employees	5,408	14,392	25,771	29,387

5.2.1.10.5.3. Effects of Plan JCCL-P1. Employment generated by construction of the project would tend to be temporary. In addition to employment generated by construction of the project, the improved flood protection would indirectly help control overall economic development costs and enhance employment opportunities.

TABLE 5-2-1-10-5
Civilian Employment/Unemployment Trends
East Baton Rouge Parish

Employment	Civilian Labor Force	Employed	Unemployed	Unemployment Percent
1960	83,805	78,567	51,136	6.1
1970	107,422	102,577	4,845	4.5
1980	171,057	161,997	9,060	5.3
1983	174,600	160,000	14,600	8.4
1988	200,800	184,100	16,700	8.3

5.2.1.10.5.4. Effects of Plan JCCL-P3. Impacts would be similar to those of Plan JCCL-P1. The smaller project (no work on the tributaries) would reduce the effects of employment created directly by the project.

5.2.1.10.6. Community and Regional Growth.

5.2.1.10.6.1. Significance. Community and regional growth trends in the vicinity of Baton Rouge have been influenced largely by economic developments, including port and petrochemical activities, by the expansion of governmental services centered at the state capitol, and the growth of LSU and Southern University. As a result of this growth and continued population increase, this watershed and the parish have required additional flood protection.

5.2.1.10.6.2. Effects of No Action. Historically, growth has occurred from the Mississippi River to the east-southeast along Interstate Highway 10 and 12. Much of the land along the Jones Creek tributaries are fully developed so future growth should occur along the main stem located between the two interstate highways. Some growth would occur even without additional flood protection.

5.2.1.10.6.3. Effects of Plan JCCL-P1. Improved drainage throughout the entire watershed would facilitate continued growth from east to west.

5.2.1.10.6.4. Effects of Plan JCCL-P3. Impacts would be similar to Plan JCCL-P1.

5.2.1.10.7. Displacement of People.

5.2.1.10.7.1. Significance. As discussed in the section of Housing, some 1,532 residential structures are located within the 100-year flood zone. Assuming that the size of an average household within this zone is about the same as an average household in East Baton Rouge Parish as reported in the 1990 census, or 2.65 persons, the total population living within this 100-year flood zone is about 4,060.

5.2.1.10.7.2. Effects of No Action. The periodic flooding of some residences within the watershed could cause those living in the lower elevations to move, seeking shelter in more protected areas.

5.2.1.10.7.3. Effects of Plan JCCL-P1. Assuming the average number of persons per household within the 100-year flood zone would be 2.65 (similar to the number of persons per household living in East Baton Rouge Parish in 1990), this plan would reduce the total number of people i the 100-year floodplain from 4,000 to 100, a reduction of 3,900. Flooding which occurs with greater frequency, would also be reduced, reducing the possibility of displacement to people living in houses with less than 100-year flood protection. No relocation of residential structures will be required due to construction.

5.2.1.10.7.4. Effects of Plan JCCL-P3. The impacts would be similar to Plan JCCL-P1. An estimated 2,770 people currently living in the 100-year flood zone would no longer be subject to floods of this frequency, and possible displacement.

5.2.1.10.8. Displacement of Farms.

5.2.1.10.8.1. Significance. Agricultural land in East Baton Rouge Parish decreased by 40,000 acres from 1972 to 1985. While this acreage is decreasing, it still accounts for 32 percent of the total. Most of the remaining agriculture land is in the northern half of the parish and the extreme southern sub-basin of Bayou Fountain. As discussed previously, the pattern of urban expansion has resulted largely from the conversion of agricultural and forest land to urban uses.

5.2.1.10.8.2. Effects of No Action. Only 975 acres of agricultural land remain in this watershed. Under without-project conditions, a further decrease is expected as the population grows and changes in technology continue.

5.2.1.10.8.3. Effects of Plan JCCL-P1. Improved flood protection would probably have a minimal impact on farms in this watershed. The alternative, as well as any other flood control measure of this or any other watershed, would reduce the annual flooding on a minimal amount of wetlands, including farmed wetlands. These lands may be subject to the wetland conversion provisions of the Food Security Act of 1985 (Public Law 99-198).

These provisions discourage conversions of farmed wetlands and abandoned farmed wetlands for the production of an agricultural commodity. The means of discouraging such activities include sharply reducing the participating landowner or operator's eligibility in a number of USDA programs including any type of price support, certain farm loans including house loans, disaster payments, and crop insurance. Therefore, the financial consequences to any individual unfamiliar with Public Law 99-198 who produces agricultural commodities on farmed wetlands or even abandoned farmed wetlands that are converted (by the flood reductions of this alternative), could be severe. However, the District Conservationist of the USDA's Soil Conservation Service indicates (see Appendix E, Section 6) that there is very little land that would be classified as farmed wetland (that could be converted) within the area where flood reductions would be produced (wetlands converted) by the project. Construction features of this plan would not impact any agricultural land, however, 70 acres zoned as farmland would be converted to permanently forested land with implementation of the offsite mitigation feature.

5.2.1.10.8.4. Effects of Plan JCCL-P3. Impacts would be similar to Plan JCCL-P1, but fewer acres (47) zoned as farmland would be converted to permanently forested land with implementation of the offsite mitigation feature.

5.2.1.10.9. Public Facilities and Services.

5.2.1.10.9.1. Significance. Public facilities and services in East Baton Rouge Parish include roads, bridges, streets, utilities, schools, fire and police protection, waste disposal, and other facilities and services normally available in a metropolitan area. Baton Rouge is also the seat of state government and is the location of the main campuses of Louisiana State University and Southern University. Adequate drainage and flood control are necessary to sustain the continued maintenance and development of these public facilities and services.

5.2.1.10.9.2. Effects of No Action. The expansion of public facilities and services would probably follow previous patterns of population growth to the east-southeast along the interstate highways.

5.2.1.10.9.3. Effects of Plan JCCL-P1. With improved flood protection, economic developments and residential expansion would also probably follow previous patterns; and the demand for public facilities and services would follow as well. This plan would not require relocations of any public and quasi-public facilities and services (e.g. roads, bridges, pipelines, etc.).

5.2.1.10.9.4. Effects of Plan JCCL-P3. Similar impacts to Plan JCCL-P1.

5.2.1.10.10. Tax Revenues.

5.2.1.10.10.1. Significance. Tax revenues directly related to changes in the level of flood protection do not represent a major source of local or state revenues. More significant sources of revenue come from the collection of sales and income tax, only indirectly influenced by an area's level of flood protection.

5.2.1.10.10.2. Effects of No Action. Without additional flood protection in the marginally protected ports, economic development would be attracted to other areas where the potential for revenues would be greater.

5.2.1.10.10.3. Effects of Plan JCCL-P1. Improved flood protection could attract development in areas where protection is currently marginal or inadequate. The increased development and improved protection would help to maintain the stability of the tax base.

5.2.1.10.10.4. Effects of Plan JCCL-P3. Impacts would be similar to Plan JCCL-P1.

5.2.1.10.11. Community Cohesion.

5.2.1.10.11.1. Significance. Community cohesion can best be defined as a "sense of community" among members of a neighborhood, subdivision, or small community. While the general consensus of community opinion within East Baton Rouge Parish seems to support the level of flood protection required for economic and residential growth along traditional trends, concerns over the potential for adverse environmental impacts appear to have increased in recent years, including the impacts to fish and wildlife resources and scenic streams, as well as other conditions affecting human health and the quality of life. The environmental review process is designed to give the public an opportunity to comment on proposals influencing individual concerns and the concerns of the community at large. In general, the level of support expressed by local and state officials reflects the desires of the community.

5.2.1.10.11.2. Effects of No Action. If no action is taken to improve flood protection in the watershed, residents who are experiencing frequent flooding may eventually choose to relocate.

5.2.1.10.11.3. Effects of Plan JCCL-P1. Minimal impact to community cohesion as flood protection is improved with very little environmental changes.

5.2.1.10.11.4. Effects of Plan JCCL-P3. Similar impacts to Plan JCCL-P1.

5.2.2 **Ward Creek Basin**

5.2.2.1. AGRICULTURAL LANDS

5.2.2.1.1. Significance. This is the same as for this category under Jones Creek.

5.2.2.1.2. Effects of No Action. This is the same as for this category under Jones Creek.

5.2.2.1.3. Effects of Plan WCC-P4A5. This is essentially the same as for this category under Jones Creek, but implementation of mitigation for this alternative would consist of the conversion of prime and unique farmlands equal to approximately 7 percent of the combined mitigation plan conversion.

5.2.2.2. BOTTOMLAND HARDWOOD FORESTS

5.2.2.2.1. Significance. This is the same as for this category under Jones Creek.

5.2.2.2.2. Effects of No Action. This is the same as for this category under Jones Creek.

5.2.2.2.3. Effects of Plan WCC-P4A5. This is essentially the same as for this category under Jones Creek, but 22 acres and 12 HUVs, according to the HES, would be lost due to construction of flood control features. These losses would be fully compensated with the habitat mitigation plan. A total of 19.15 AAHU's would be lost for all evaluation species as determined by the HEP for this alternative.

5.2.2.3. THREATENED AND ENDANGERED SPECIES

5.2.2.3.1. Significance. This is the same as for this category under Jones Creek. It is noted that the eagle nest mentioned is not in the Ward Creek area.

5.2.2.3.2. Effects of No Action. This is the same as for this category under Jones Creek.

5.2.2.3.3. Effects of Plan WCC-P4A5. This is essentially the same as for this category under Jones Creek. It is noted that flows from this watershed are deposited into Bayou Manchac. There sediments are slowly released from suspension and some finer materials would be transported to the Amite River. There would be no effects resulting from implementation of this alternative to the special old-growth wooded area of concern mentioned by the LNHP. Channel modification work would not extend upstream to that area, but would stop just downstream of Interstate 12.

5.2.2.4. AQUATIC RESOURCES

5.2.2.4.1. Water Quality Features

5.2.2.4.1.1. Significance. This is the same as for this category under Jones Creek.

5.2.2.4.1.2. Effects of No Action. This is the same as for this category under Jones Creek.

5.2.2.4.1.3. Effects of Plan WCC-P4A5. This is essentially the same as for this category under Jones Creek, but only 1.3 of the entire 14.2 miles to be modified would be concrete lined. The remainder would be cleared and snagged. Instream temperatures would be increased but the relatively short length of concrete lining would result in a comparatively small increase in temperatures throughout the remaining length. The temperature increases as a result of clearing and snagging would be much less pronounced.

5.2.2.4.2. Ecological Features

5.2.2.4.2.1. Significance. This is the same as for this category under Jones Creek. However, the Mississippi River levee borrow pits do provide nursery habitat for several species and also make a significant contribution to overall primary productivity. When the river recedes, however, there is no connection to allow fish to move between the two bodies. Thus, because of hot summer temperatures in the pits, fish inhabiting them are fish that are able to withstand prolonged periods of low dissolved oxygen levels.

5.2.2.4.2.2. Effects of No Action. This is the same as for this category under Jones Creek.

5.2.2.4.2.3. Effects of Plan WCC-P4A5. This is essentially the same as for this category under Jones Creek. However, as as mentioned previously in paragraph 5.2.4.1.3., the limited amount of concrete lining would result in less bank modifications, which would result in a reduction in the amount of shading vegetation removed. The reduced amount of water temperature reduction would result in less impacts to any aquatic fauna that is sensitive to increased temperatures than would more extensive concrete lining. The deposition of excavated material into Mississippi River borrow pits would result in a reduction of the amount of aquatic habitat. Assuming borrow pit depths of 15 feet and 1 on 2 side slopes, approximately 7 acres would be filled with excavated material. This would be a change from habitat for fish to habitat for a variety of wetland creatures other than fish. Creatures using the areas would include mink, raccoon, crawfish, frogs, turtles, wading birds, and wintering waterfowl. Borrow pit habitat is rated as a habitat of medium to low value according to the USFWS habitat rating system. These habitats often have potential value as candidate areas for mitigating losses of another habitat. High water periods and winds would provide a seed source as well as inundating waters and willows would rapidly become established following minimal drying.

5.2.2.5. CULTURAL RESOURCES

5.2.2.5.1. Significance. Cultural resources investigations were completed for Ward Creek and the North Branch of Ward Creek during 1990 as part of the current feasibility study. The results of these investigations indicate that the project area has been extensively modified by channel enlargement and channel diversions. No significant cultural resources were encountered in the project area during these investigations and no significant cultural resources are anticipated. A review of the State Site Records indicates that two sites, 16EBR31 and 16EBR34, below the confluence of Bayou Duplantier and Dawson Creek, and one site, 16EBR77, adjacent to Ward Creek, are located in close proximity to the project area.

5.2.2.5.2. Effects of No Action. Channelization, enlargement, and construction within the project area are likely to continue as urbanization continues. Significant cultural resources are unlikely to be encountered due to impacts already sustained to the project area.

5.2.2.5.3. Effects of Plan WCC-P4A5. The project calls for clearing and snagging of approximately 9.2 miles along Ward Creek, 3.7 miles of clearing and snagging along Dawson Creek, and concrete lining along 1.3 to 2.6 miles of North Branch of Ward Creek. Cultural resources investigations have been completed for portions of the project located along Ward Creek and North Branch of Ward Creek. Three archeological sites are recorded in close proximity to the project area (16EBR31, 16EBR34, and 16EBR77). Clearing and snagging in the vicinity of these sites should not impact the sites however, further efforts to assess the potential for project impacts will be conducted during the design phase of the project. The SHPO has been informed of these recommendations (Appendix G).

5.2.2.6. RECREATION RESOURCES

5.2.2.6.1. Significance. This is the same as for this category under Jones Creek.

5.2.2.6.2. Effects of No Action. This is the same as for this category under Jones Creek.

5.2.2.6.3. Effects of Plan WCC–P4A5. No recreation development is proposed under this plan since limited land is available in public ownership.

5.2.2.7. AESTHETICS

5.2.2.7.1. Significance. This is the same as for this category under Jones Creek.

5.2.2.7.2. Effects of No Action. This is the same as for this category under Jones Creek.

5.2.2.7.3. Effects of Plan WCC–P4A5. This is essentially the same for this category under Jones Creek. However, approximately 1.5 miles of stream bank vegetation would be lost on both sides along the upper bank of the north Branch tributary. This impacted area would require revegetation in order to return lost aesthetic quality. The 1.5 miles to be planted with the aesthetic mitigation plan would replace the lost aesthetic value.

5.2.2.8. NOISE

5.2.2.8.1. Significance. This is the same as for this category under Jones Creek.

5.2.2.8.2. Effects of No Action. This is the same as for this category under Jones Creek.

5.2.2.8.3. Effects of Plan WCC-P4A5. This is essentially the same as for this category under Jones Creek. The total duration for project construction is projected to be approximately 18 months.

5.2.2.9. VECTORS

5.2.2.9.1. Significance. This is the same as for this category under Jones Creek.

5.2.2.9.2. Effects of No Action. This is the same as for this category under Jones Creek.

5.2.2.9.3. Effects of Plan WCC-P4A5. This is the same as for this category under Jones Creek.

5.2.2.10. SOCIOECONOMIC RESOURCES

The purpose of this section is describe the more significant social and economic conditions of the area and to identify potential impacts of various project alternatives, including no Federal action.

5.2.2.10.1. Land Use.

5.2.2.10.1.1. Significance. This is the same as for this category under Jones Creek.

5.2.2.10.1.2. Effects of No Action. The general effects of no action would include the continued level of flood hazard in the Ward Creek Watershed. As shown in Table 5-2-2-10-1, over 80 percent of the total land area is currently in urban use. Increased urban growth will continue through the continued conversion of agricultural and forest lands, influenced in part by the area's level of flood protection.

TABLE 5-2-2-10-1
Ward Creek Watershed 1985

Basin #	Urban	Agri	Forest	Water	Wetlands	Other	Total
21	4,853	704	896	0	0	21	6,474
25	3,916	91	460	302	0	2	4,771
26	2,674	140	91	0	0	0	2,905
27	4,698	18	109	0	0	19	4,844
30	1,585	415	207	0	0	0	2,207
Total	17,726	1,368	1,763	302	0	42	21,201

5.2.2.10.1.3. <u>Effects of Plan WCC-P4A5</u>. The immediate effects of the above plan on land use would be a reduction in the current level of flood hazard that threatens developments in the less protected areas of the watershed, primarily residential developmental. There are no direct changes in land use due to project construction.

5.2.2.10.2. Housing.

5.2.2.10.2.1. <u>Significance</u>. This is the same as for this category under Jones Creek.

5.2.2.10.2.2. <u>Effects of No Action</u>. The effect of no action, or the lack of any other flood control program, would result in the continued periodic flooding of those houses within the watershed that have inadequate flood protection. Recent studies of this watershed indicate that approximately 1,123 residential structures have floor elevations at or below the 100-year level of flood protection. Current insurance programs for homeowners encourage new construction to provide greater protection.

5.2.2.10.2.3. <u>Effects of Plan WCC-P4A5</u>. Completion of this plan would reduce the threat of flooding within the watershed. With the project in place, the number of residential structures with floor elevations at or below the 100-year level of protection would decline from 1,123 to 787.

5.2.2.10.3. Property Value.

5.2.2.10.3.1. <u>Significance</u>. This is the same as for this category under Jones Creek.

5.2.2.10.3.2. <u>Effects of No Action</u>. This is the same as for No Action in Jones Creek.

5.2.2.10.3.3. Effects of Plan WCC-P4A5. The drainage improvements offered by this plan would tend to raise the value of existing developments where the potential for flood damages is the greatest. The value of undeveloped area would also tend to rise.

5.2.2.10.4. Business and Industry.

5.2.2.10.4.1. Significance. This in the same as for this category under Jones Creek.

5.2.2.10.4.2. Effects of No Action. This is the same as for No Action in Jones Creek.

5.2.2.10.4.3. Effects of Plan WCC-P4A5. Improved flood protection would reduce physical damages to business and industries, as well as reduce possible disruption of normal business activities, with an accompanying income loss.

5.2.2.10.5. Employment.

5.2.2.10.5.1. Significance. This is the same as for this category under Jones Creek.

5.2.2.10.5.2. Effects of No Action. This is the same as for No Action in Jones Creek.

5.2.2.10.5.3. Effects of Plan WCC-P4A5. Employment generated by construction of the project would tend to be temporary. In addition to this employment, the improved flood protection would indirectly help control overall economic development costs and enhance employment opportunities.

5.2.2.10.6. Community and Regional Growth.

5.2.2.10.6.1. Significance. This is the same as for this category under Jones Creek.

5.2.2.10.6.2. Effects of No Action. This watershed is already one of the more urbanized in the parish. Growth should continue in this watershed along Interstate 10 even without additional flood protection.

5.2.2.10.6.3. Effects of Plan WWC-P4A5. Improved drainage throughout the watershed would facilitate expected continued growth.

5.2.2.10.7. Displacement of People.

5.2.2.10.7.1. Significance. As discussed in the section on Housing, some 1,123 residential structures are located within the 100-year flood zone. Assuming that the size of an average household within this zone is about the same as an average household in East

Baton Rouge Parish (2.65 persons - 1990 Census), the total population living within this 100-year flood zone is about 2,975.

5.2.2.10.7.2. Effects of No Action. This is the same as for No Action in Jones Creek.

5.2.2.10.7.3. Effects of Plan WCC-P4A5. Assuming the average number of persons per household within the 100-year flood zone would also be 2.65, this plan would reduce the total number of people in the 100-year floodplain from 2,975 to 2,085, a reduction of 890.

5.2.2.10.8. Displacement of Farms.

5.2.2.10.8.1. Significance. This is the same as for this category under Jones Creek.

5.2.2.10.8.2. Effects of No Action. Agricultural lands in the watershed totaled nearly 1,400 acres in 1985. This number is expected to decrease as urban encroachment continues.

5.2.2.10.8.3. Effects of Plan WCC-P4A5. Minimal impacts to farmland in this watershed as it is already highly urbanized. Construction features of this plan would not impact any agricultural land, however, 20 acres zoned as farmland would be converted to permanently forested land with implementation of offsite mitigation.

5.2.2.10.9. Public Facilities and Services.

5.2.2.10.9.1. Significance. This is the same as for this category under Jones Creek.

5.2.2.10.9.2. Effects of No Action. The expansion of public facilities and services would probably follow previous patterns of population growth to the east-southeast along Interstate 10.

5.2.2.10.9.3 Effects of Plan WCC-P4A5. With improved flood protection, the demand for public facilities and services would follow residential expansions along previous patterns of growth. This plan would not require any relocations of public and quasi-public facilities and services.

5.2.2.10.10. Tax Revenues.

5.2.2.10.10.1. Significance. This is the same as for this category under Jones Creek.

5.2.2.10.10.2. Effects of No Action. This is the same as for No Action in Jones Creek.

5.2.2.10.10.3. Effects of Plan WCC-P4A5. Improved flood protection could attract development in areas where protection is currently marginal or inadequate. The increased development and improved protection would help to maintain the stability of the tax base.

5.2.2.10.11. Community Cohesion.

5.2.2.10.11.1. Significance. This is the same as for this category under Jones Creek.

5.2.2.10.11.2. Effects of No Action. This is the same as for No Action in Jones Creek.

5.2.2.10.11.3. Effects of Plan WCC-P4A5. Minimal impact to community cohesion as flood protection is improved with very little environmental change.

5.2.3. **Bayou Fountain Basin**

5.2.3.1. AGRICULTURAL LANDS

5.2.3.1.1. Significance. This is the same as for this category under Jones Creek.

5.2.3.1.2. Effects of No Action. This is the same as for this category under Jones Creek.

5.2.3.1.3. Effects of Plan BF10-A. This is essentially the same as for this category under Jones Creek, but implementation of mitigation for this alternative would consist of the conversion of prime and unique farmlands equal to approximately 5 percent of the combined mitigation plan conversion.

5.2.3.1.3. Effects of Plan BF10-B. This is essentially the same as for Plan BF10-A.

5.2.3.2. BOTTOMLAND HARDWOOD FORESTS

5.2.3.2.1. Significance. This is the same as for this category under Jones Creek. However, there is a significant area of wooded wetlands just north of Bluebonnet Road and east of Highland Road. This area is a unique swamp area of cypress, red maple, green ash, and pumpkin ash in a sump within the terrace formation just before it descends into the alluvial floodplain at the edge of the Baton Rouge urban area. The area is a property of The Nature Conservancy (TNC). TNC acquires properties such as this that are under threat of destruction by development and that have some type of unique ecological characteristic. The plan is to preserve the area and to possibly develop the area into an educational park.

5.2.3.2.2. Effects of No Action. This is the same as for this category under Jones Creek. However, there is concern for preserving the degree of wetness of the wooded wetland

area just north of Bluebonnet Road and east of Highland Road. The degree of wetness would be determined primarily by the factors determining low-flow conditions of the watercourse that drains the area. The low-flow stages are determined by the depth of the channel below the Bluebonnet Road bridge, the invert or sill of the culvert under Highland Road, and the size of and restrictions within the channel between these bridges.

5.2.3.2.3. Effects of Plan BF10-A. This is essentially the same as for this category under Jones Creek, but 15 acres and 8 HUVs, according to the HES, would be lost due to construction of flood control features. These losses would be fully compensated with the habitat mitigation plan. The wooded wetland area just north of Bluebonnet Road and east of Highland Road would not be impacted by this alternative. This alternative would not affect any of the factors that determine the low-flow stages in the watercourse that drains the area.

5.2.3.2.3. Effects of Plan BF10-B. This is the same as for Plan BF-10A, but 17 acres and 9 HUVs would be lost due to flood control features. Neither would this alternative affect any factor that determines low-flow stages in the watercourse that drains the Bluebonnet swamp area. A total of 25.94 AAHU's would be lost for all evaluation species as determined by the HEP for this alternative.

5.2.3.3. THREATENED AND ENDANGERED SPECIES

5.2.3.3.1. Significance. This is the same as for this category under Jones Creek. However, the eagle nest mentioned (that currently is not being used) is located near this watershed.

5.2.3.3.2. Effects of No Action. This is the same as for this category under Jones Creek.

5.2.3.3.3. Effects of Plan BF10-A. This is essentially the same as for this category under Jones Creek. The lower 4.4 miles of the channel modification would consist of clearing and snagging. As is true for Ward Creek, it is noted that flows from this watershed are also deposited into Bayou Manchac. There, as again true for Ward Creek, transported materials would slowly be released from suspension and some finer materials would be transported to the Amite River. The much larger volume and transport capacity of the Amite River would dilute and move any particles that would be delivered to it. Therefore, the inflated heelsplitter would not be affected by the implementation of this alternative. The clearing and snagging that is proposed near the area of the eagle nest would be scheduled to be done in that area in non-nesting periods if nesting activity is resumed again at that site or another site near the proposed work area. Therefore, if the eagles return to the area they would not be affected by the implementation of this alternative.

5.2.3.3.4. Effects of Plan BF10-B. This is the same as for Plan BF10-A.

5.2.3.4. AQUATIC RESOURCES

5.2.3.4.1. Water Quality Features

5.2.3.4.1.1. Significance. This is the same as for this category under Jones Creek.

5.2.3.4.1.2. Effects of No Action. This is the same as for this category under Jones Creek.

5.2.3.4.1.3. Effects of Plan BF-10A. This is similar for this category as that for Jones Creek, but only 2.9 of the total 8.1 miles to be modified would receive channel enlargement. The remainder would be cleared and snagged. The removal of any shading vegetation, whether by channel enlargement or by clearing and snagging would result in increases of water temperature. However, shading would occur more rapidly on cleared and snagged segments than on channel segments that are enlarged.

5.2.3.4.1.3. Effects of Plan BF-10B. This is essentially the same as for this category under Plan BF-10A. The additional 2.5 miles of clearing and snagging would result in some increases in water temperatures when compared to Plan BF-10A.

5.2.3.4.2. Ecological Features

5.2.3.4.2.1. Significance. This is the same as for this category under Ward Creek.

5.2.3.4.2.2. Effects of No Action. This is the same as for this category under Jones Creek.

5.2.3.4.2.3. Effects of Plan BF-10A. This is similar for this category as under Ward Creek. The majority, 5.2 miles, of the modifications consist of clearing and snagging while the remaining 2.9 miles consist of channel enlargement. Channel enlargement will remove all forms of diversity of habitats, while clearing and snagging will still leave some diversity such as tree roots and some accumulated sediments in the channels. Both methods will include removal of overhanging vegetation, but channel enlargement will include removal of an approximate 25-foot band of trees along the banks, as available, for equipment access also. Organisms with limited mobility may be destroyed as the equipment works in the channel but any fish species likely to be found in these streams is normally sufficiently mobile to escape draglines and other construction equipment. Turbidity caused by the equipment would likely cause suffocation in the immediate area if organisms could not escape from the area. The deposition of excavated material into Mississippi River borrow pits would result in a reduction of the amount of aquatic habitat with an increase in wooded and wetland habitats. Assuming borrow pit depths of 15 feet and 1 on 2 side slopes, approximately 14 acres would be filled with excavated material. This would be a change from habitat for fish to habitat for a variety of wetland creatures

other than fish. Creatures using the areas would include mink, raccoon, crawfish, frogs, turtles, wading birds, and wintering waterfowl (see Ward Creek, Paragraph 5.2.2.4.2.3).

5.2.3.4.2.4. Effects of Plan BF-10B. This is the same for this alternative as for Plan BF-10A. However, because of the 2.5-mile increase in the amount of upstream clearing and snagging, that amount of additional adverse impacts would occur.

5.2.3.5. CULTURAL RESOURCES

5.2.3.5.1. Significance. There are presently six properties currently listed on or pending nomination to the National Register of Historic Places located in proximity to the project area. Planter's Cabin was nominated to the Register in 1984, the Joseph Pettitpierre House was nominated in 1986, Mount Hope Plantation was nominated in 1980, and the Lee Site (16EBR51) was nominated in 1984. Nominations are pending for Live Oak Plantation and the Ory House. In addition to the Lee Site (16EBR51), five archeological sites have been recorded in close proximity to the project area; sites included are 16EBR01, 16EBR04, 16EBR05, 16EBR65, and 16EBR67. All of these properties are located on the Prairie terrace surface which lies adjacent to the Bayou Fountain floodplain and the project area.

Literature and records research coupled with reconnaissance fieldwork was conducted under this feasibility study (Goodwin et al. 1990). Although no sites were recorded in the project area some evidence of disturbed remains of 20th century occupation exists. The fieldwork indicated that modern alluvial deposits of considerable thickness are present within the project area and any earlier cultural deposits are likely to be deeply buried. The disposition of known archeological sites, the settlement history of the project area, and the results of the fieldwork would indicate that the project area is assumed to contain a high probability for encountering significant cultural resources.

Historic records indicate a series of contiguous land grants fronting Bayou Fountain were made during the late eighteenth century. The area remained settled during much of the subsequent historic period. Significant remains associated with the late eighteenth through 20th century settlement of the area are anticipated to occur in deeply buried material throughout the entire project area.

5.2.3.5.2. Effects of No Action. Potentially significant cultural remains are expected to occur within deeply buried contexts adjacent to recorded archeological sites within on the floodplain of Bayou Fountain. Continued flooding would result in additional sediment infilling of the area further obscuring any unrecorded and potentially significant cultural resources. Channel migration of Bayou Fountain could expose and eventually erode potentially significant resources.

5.2.3.5.3. Effects of Plan BF10-A AND BF10-B. The project calls for improvements of approximately 11 miles of channel from the bayou's mouth to Ben Hur Road. Improvements will consists of clearing and snagging of the entire reach with the exception of a section between Siegen and Gardere Lanes. In this reach, the channel will be widened for construction of a concrete lined channel with a 50-foot bottom width. Prehistoric cultural remains are likely to occur adjacent to known archeological sites located on the adjacent Prairie terrace surface. Potentially significant cultural deposits associated with sites 16EBR1, 16EBR4, and 16EBR65 may occur within the reach where channel widening and lining are planned. Archeological deposits also are expected to occur within portions of the project adjacent to Site 16EBR5. This site is located on the Prairie terrace surface near the mouth of Bayou Fountain. Plans for clearing and snagging along this reach of the bayou should have no impact to significant cultural resources. Sites 16EBR51 and 16EBR67 are located in a large erosional gully that cuts into the surrounding Prairie terrace surface on the north side of Bayou Fountain. Plans for clearing and snagging will not impact the sites. No significant cultural resources are expected to occur in the area.

Up to four potentially significant archeological sites are expected to occur within deeply buried contexts in the project area. Clearing and snagging will not adversely impact any sites. Plans to widen and concrete line a portion of the channel from Siegen to Gardere Lanes has the potential for impacting potentially significant sites which may be located in this area. Intensive survey conducted during the design phase is recommended for the entire 11 mile project area. Any sites identified during these investigations will be evaluated in terms of their National Register significance and project impacts will be assessed. The SHPO has been informed of these recommendations (Appendix G).

5.2.3.6. RECREATION RESOURCES

5.2.3.6.1. Significance. This is the same as for this category under Jones Creek.

5.2.3.6.2. Effects of No Action. This is the same as for this category under Jones Creek.

5.2.3.6.3. Effects of Plan BF–10A. This is the same as for this category under the Ward Creek WCC–P4A5.

5.2.3.6.4. Effects of Plan BF–10B. This is the same as for this category under the Plan WCC–P4A5.

5.2.3.7. AESTHETICS

5.2.3.7.1. Significance. This is the same as for this category under Jones Creek.

5.2.3.7.2. Effects of No Action. This is the same as for this category under Jones Creek.

5.2.3.7.3. Effects of Plan BF—10A. Impacts to existing aesthetics and proposed mitigation techniques are essentially the same for this category as under Jones Creek. However, approximately 2.5 miles of stream bank vegetation would be lost along both sides of the upper bank of the Bayou Fountain within the impacted area of channel enlargement. This area would require re—vegetation in order to return lost aesthetic quality. The planting of trees and shrubs along both sides of 2.5 miles of stream would mitigate aesthetic losses.

5.2.3.7.4. Effects of Plan BF—10B. This is the same as for BF—10A plan.

5.2.3.8. NOISE

5.2.3.8.1. Significance. This is the same as for this category under Jones Creek.

5.2.3.8.2. Effects of No Action. This is the same as for this category under Jones Creek.

5.2.3.8.3. Effects of Plan BF-10A. This is essentially the same as for this category under Jones Creek. The total duration for project construction is projected to be approximately 18 months.

5.2.3.8.4. Effects of Plan BF-10B. This is the same as for BF—10A plan.

5.2.3.9. VECTORS

5.2.3.9.1. Significance. This is the same as for this category under Jones Creek.

5.2.3.9.2. Effects of No Action. This is the same as for this category under Jones Creek.

5.2.3.9.3. Effects of All Plans. This is the same as for this category under Jones Creek.

5.2.3.10. SOCIOECONOMIC RESOURCES

5.2.3.10.1. Significance. The purpose of this section is to describe the more significant social and economic conditions of the area and to identify potential impacts of various project alternatives, including no Federal action.

5.2.3.10.1. Land Use.

5.2.3.10.1.1. Significance. This the same as for this category under Jones Creek.

5.2.3.10.1.2. Effects of No Action. The general effects of no action would include the continued level of flood hazard in the Bayou Fountain Watershed. As shown in Table 5-2-3-10-1, this watershed is one of the more underdeveloped in the study area.

The trend of growth in urban land can be expected to continue through the conversion of agricultural and forest lands, influenced in part by the level of flood protection.

5.2.3.10.1.3. Effects of Plan BF-10A. The immediate effects of the above plan on land use would be a reduction in the current level of flood hazard that threatens developments in the less protected areas of the watershed. There are no direct changes in land use due to construction.

5.2.3.10.1.4. Effects of Plan BF-10B. Similar impacts to Plan BF-10A. Slightly more of a reduction in the flood hazard as clearing and snagging is conducted over a longer portion of the bayou.

TABLE 5-2-3-10-1
Bayou Fountain Watershed 1985 Land Use

Urban	6,420 acres
Agriculture	11,195 acres
Forest	3,881 acres
Water	53 acres
Wetlands	3,869 acres
Other	390 acres
Totals	25,808 acres

5.2.3.10.2. Housing.

5.2.3.10.2.1. Significance. This is the same as for this category under Jones Creek.

5.2.3.10.2.2. Effects of No Action. The effect of no action, or the lack of any other flood control program, would result in the continued periodic flooding of those houses within the watershed that have inadequate flood protection. Recent surveys of this watershed indicate that approximately 405 residential structures have floor elevations at or below the current 100-year level of flood protection. Current insurance programs for homeowners encourage new construction to provide greater protection.

5.2.3.10.2.3. Effects of Plan BF-10A. Completion of this plan would reduce the threat of flooding within the watershed. With the project in place, the number of residential structures with floor elevations at or below the 100-year level of protection would decline

from 405 to 398. The main impact, however, would be the reduction of flood risk of many of these structures from a storm with a frequency of 25 years or less.

5.2.3.10.2.4. Effects of Plan BF-10B. Similar impacts to Plan BF-10A.

5.2.3.10.3. Property Value.

5.2.3.10.3.1. Significance. This is the same as for this category under Jones Creek.

5.2.3.10.3.2. Effects of No Action. This is the same as for No Action in Jones Creek.

5.2.3.10.3.3. Effects of Plan BF-10A. The drainage improvements offered by this plan would tend to raise the value of existing developments where the potential for flood damage is the greatest. The value of undeveloped areas would also tend to rise.

5.2.3.10.3.4. Effects of Plan BF-10B. Similar impacts to Plan BF-10A.

5.2.3.10.4. Business and Industry.

5.2.3.10.4.1. Significance. This is the same as for this category under Jones Creek.

5.2.3.10.4.2. Effects of No Action Plan. This is the same as for No Action in Jones Creek.

5.2.3.10.4.3. Effects of Plan BF-10A. Improved flood protection would reduce physical damages to businesses and industries, as well as reduce possible disruption of normal business activities, with an accompanying income loss.

5.2.3.10.4.4. Effects of Plan BF-10B. Similar impacts to Plan BF-10A.

5.2.3.10.5. Employment.

5.2.3.10.5.1. Significance. This is the same as for this category under Jones Creek.

5.2.3.10.5.2. Effects of No Action. This is the same as for No Action in Jones Creek.

5.2.3.10.5.3. Effects of Plan BF-10A. Employment generated by construction of the project would tend to be temporary. In addition to this employment, the improved flood protection would indirectly help control overall economic development costs and enhance employment opportunities.

5.2.3.10.5.4. Effects of Plan BF-10B. Impacts would be similar to Plan BF-10A.

5.2.3.10.6. Community and Regional Growth.

5.2.3.10.6.1. Significance. This is the same as for this category under Jones Creek.

5.2.3.10.6.2. Effects of No Action. This is a rapidly developing watershed located to the south and southeast of the Baton Rouge urbanized area. Major industrial sites are located along the Mississippi River portion of this watershed. It serves as the place of residence for workers in both Baton Rouge and the river industries. Growth is expected to continue even without additional flood protection.

5.2.3.10.6.3. Effects of Plan BF-10A. Improved drainage throughout the watershed would facilitate the expected continued growth.

5.2.3.10.6.4. Effects of Plan BF-10B. Similar impacts to Plan BF-10A.

5.2.3.10.7. Displacement of People.

5.2.3.10.7.1. Significance. As discussed i the section on Housing, some 405 residential structures are located within the 100-year flood zone. Assuming the size of an average household within this zone is about the same as an average household in East Baton Rouge Parish as reported in the 1990 Census, or 2.65 persons, the total population living within this 100-year flood zone is about 1,100.

5.2.3.10.7.2. Effects of No Action. The periodic flooding of some residences within the watershed could cause those living in the lower elevations to move, seeking shelter in more protected areas.

5.2.3.10.7.3. Effects of Plan BF-10A. Assuming the average number of persons per household would be 2.65 (similar to the 1990 Census number for East Baton Rouge Parish), this plan would reduce the total number of people in the 100-year floodplain from 1,100 to 1,050.

5.2.3.10.7.4. Effects of Plan BF-10B. Similar impacts to Plan BF-10A.

5.2.3.10.8. Displacement of Farms.

5.2.3.10.8.1. Significance. This is the same as for this category under Jones Creek.

5.2.3.10.8.2. Effects of No Action. Over 43 percent of this watershed remains in agricultural lands. The 1985 total of 11,200 acres does, however, represents a decrease of 1,200 acres since 1978. Even without any project, the potential for urban growth in this area is great, as it is located near the city of Baton Rouge and to Louisiana State

University, and it borders on the Mississippi River which provides opportunities for industrial development.

5.2.3.10.8.3. Effects of Plan BF-10A. Improved flood protection would probably have minimal impact on farms in this watershed. Construction features of this plan would not impact any agricultural land, however, approximately 15 acres, zoned as farmland, would be converted to permanently forested land with implementation of the offsite mitigation feature.

5.2.3.10.8.4. Effects of Plan BF-10B. Impacts are similar to Plan BF-10A. Construction features would not impact any agricultural land, however, approximately 13 acres of zoned farmland would be set aside for offsite mitigation purposes.

5.2.3.10.9. Public Facilities and Services.

5.2.3.10.9.1. Significance. This is the same as for this category under Jones Creek.

5.2.3.10.9.2. Effects of No Action. The expansion of public facilities and services would probably follow previous patterns of population growth to the east-southeast along Highland Road.

5.2.3.10.9.3. Effects of BF-10A Plan. With improved flood protection, economic developments and residential expansion would also probably follow previous patterns; and the demand for public facilities and services would follow as well. Relocation of one culvert and one petroleum pipeline would be required.

5.2.3.10.9.4. Effects of Plan BF-10B. Similar impacts to Plan BF-10A.

5.2.3.10.10. Tax Revenues.

5.2.3.10.10.1. Significance. This is the same as for this category under Jones Creek.

5.2.3.10.10.2. Effects of No Action. This is the same as for No Action in Jones Creek.

5.2.3.10.10.3. Effects of Plan BF-10A. Improved flood protection could attract development in areas where protection is currently marginal or inadequate. The increased development and improved protection would help to maintain the stability of the tax base.

5.2.3.10.10.4. Effects of Plan BF-10B. Similar impacts to Plan BF-10A.

5.2.3.10.11. Community Cohesion.

5.2.3.10.11.1. Significance. This is the same as for this category under Jones Creek.

5.2.3.10.11.2. Effects of No Action Plan. This is the same as for No Action under Jones Creek.

5.2.3.10.11.3. Effects of Plan BF-10A. Minimal impact to community cohesion as flood protection is improved with very little environmental change.

5.2.3.10.11.4. Effects of Plan BF-10B. Similar impacts to Plan BF-10A.

5.2.4. **Beaver Bayou Basin**

5.2.4.1. AGRICULTURAL LANDS

5.2.4.1.1. Significance. This is the same as for this category under Jones Creek.

5.2.4.1.2. Effects of No Action. This is the same as for this category under Jones Creek.

5.2.4.1.3. Effects of Plan BBN-P1. This is essentially the same as for this category under Jones Creek, but implementation of mitigation for this alternative would consist of the conversion of prime and unique farmlands equal to approximately 31 percent of the combined mitigation plan conversion.

5.2.4.1.4. Effects of Plan BBN-P2. This is the same as for Plan BBN-P1, but implementation of mitigation for this alternative would consist of the conversion of prime and unique farmlands equal to approximately 31 percent of the combined mitigation plan conversion.

5.2.4.1.5. Effects of Plan BBN-P3. This is the same as for Plan BBN-P1, but implementation of mitigation for this alternative would consist of the conversion of prime and unique farmlands equal to approximately 32 percent of the combined mitigation plan conversion.

5.2.4.2. BOTTOMLAND HARDWOOD FORESTS

5.2.4.2.1. Significance. This is the same as for this category under Jones Creek.

5.2.4.2.2. Effects of No Action. This is the same as for this category under Jones Creek.

5.2.4.2.3. Effects of Plan BBN-P1. This is essentially the same as for this category under Bayou Fountain except that all work would be by channel enlargement. However, 88 acres and 55 HUVs would be lost due to construction of flood control features. These losses would be fully compensated with the habitat mitigation plan.

5.2.4.2.4. Effects of Plan BBN-P2. This is essentially the same as for this category under Plan BBN-P1, but 86 acres and 54 HUVs would be lost due to construction of flood control features. These losses would be fully compensated with the habitat mitigation plan. A total of 142.77 AAHU's would be lost for all evaluation species as determined by the HEP for this alternative.

5.2.4.2.5. Effects of Plan BBN-P3. This is essentially the same as for this category under Plan BBN-P1, but 89 acres and 56 HUVs would be lost due to construction of flood control features. These losses would be fully compensated with the habitat mitigation plan.

5.2.4.3. THREATENED AND ENDANGERED SPECIES

5.2.4.3.1. Significance. This is the same as for this category under Jones Creek.

5.2.4.3.2. Effects of No Action. This is the same as for this category under Jones Creek. However, the eagle nest mentioned (that currently is not being used) is not located near this watershed. The current sediment transport capacity for the one-year event and the five-year event of 29,400 and 250,000 tons per day, respectively, on the Amite River immediately downstream of the confluence of the Comite River would be maintained. Any sediment material that may be introduced by flood flows into the Amite River would become part of the system of sediments that is constantly being moved from the upstream end to the downstream end of the point bars within the river.

5.2.4.3.3. Effects of Plan BBN-P1. This is similar for this category as for Jones Creek. It is noted that within this basin 7.8 miles of channel above Frenchtown Road would receive channel enlargement. Channel enlargement would contribute to increased bank erosion. An estimated 110,000 cubic yards of sediments is projected to accumulate within and near the mouth of the main channel over a ten-year period with no action to prevent it. However, to minimize the expected erosion, a mat of geotextile material would be placed on the channel slopes to hold vegetation and, thus, the surrounding soil. This would not prevent, but would minimize the anticipated erosion. The transport capacity of the Comite River is sufficient to distribute any sediments that would eventually be introduced into it by the implementation of this alternative. Likewise, the transport capacity of the Amite River is sufficient to move any sediments eventually introduced into it by the Comite River. Any material that may be introduced would become part of the system of sediments that is constantly being moved from the upstream end to the downstream end of

the point bars within the river. Therefore, the inflated heelsplitter would not be affected by the implementation of this alternative.

5.2.4.3.4. Effects of Plan BBN-P2. This is the same as for Plan BBN-P1.

5.2.4.3.5. Effects of Plan BBN-P3. This is the same as for Plan BBN-P1.

5.2.4.4. AQUATIC RESOURCES

5.2.4.4.1. Water Quality Features

5.2.4.4.1.1. Significance. This is the same as for this category under Jones Creek; however, the source waters are not all from urban areas.

5.2.4.4.1.2. Effects of No Action. This is the same as for this category under Jones Creek.

5.2.4.4.1.3. Effects of Plan BBN-P1. This is essentially the same as for this category under Jones Creek, but 7.8 miles of this watercourse and tributaries above Frenchtown Road would receive channel enlargement. Channel enlargement resulting in removal of overhanging vegetation would result in increases of stream temperature and reduced dissolved oxygen content. Removal of restrictions would contribute to more effective flushing actions.

5.2.4.4.1.4. Effects of Plan BBN-P2. This is essentially the same as for this category under Plan BBN-P1. The difference in excavation would make minimal difference in effects to water quality.

5.2.4.4.1.5. Effects of Plan BBN-P3. This is essentially the same as for this category under Plan BBN-P1. The difference in excavation would make minimal difference in effects to water quality.

5.2.4.4.2. Ecological Features

5.2.4.4.2.1. Significance. This is the same as for this category under Jones Creek. However, a portion of this watercourse begins in an agricultural area rather than an urban area. Therefore, the source waters are somewhat higher in ecological value than the previous basins of the overall study area discussed.

5.2.4.4.2.2. Effects of No Action. This is the same as for this category under Jones Creek.

5.2.4.4.2.3. Effects of Plan BBN-P1. This is similar for this category as that for Jones Creek and for Bayou Fountain. However, all work would consist of channel enlargement.

The right-of-way necessary for the channel enlargement would most probably result in the complete removal of all overhanging vegetation over the watercourses except the largest trees. The accompanying increase of temperature may result in a change in species diversity towards aquatic species requiring lowered dissolved oxygen. Excavation for channel enlargement would result in complete destruction of the benthic community within the channels. Complete recolonization should occur in approximately one year. The geosynthetic mat on the channel slopes should help to provide microhabitats to which smaller organisms on the food chain would adhere. Those organisms would then provide a food source to higher organisms.

5.2.4.4.2.4. Effects of Plan BBN-P2. This is essentially the same as for this category under Plan BBN-P1. The difference in required excavation for different levels of protection would make negligible difference in affects upon aquatic resources as compared to the other alternative.

5.2.4.4.2.5. Effects of Plan BBN-P3. This is essentially the same as for this category under Plan BBN-P1. The difference in required excavation for different levels of protection would make negligible difference in affects upon ecological features of aquatic resources.

5.2.4.5. CULTURAL RESOURCES

5.2.4.5.1. Significance. Beaver Bayou cuts Pleistocene terrace surfaces through less highly developed country. An intensive pedestrian survey of the project area was completed by Bryant (1985). Two potentially significant sites were recorded as a result of the survey. The Biltmore Site (16EBR66), represents the remains of a prehistoric campsite dating from the Paleo-Indian or Early Archaic period. Shanks Cemetery was reported to contain approximately 30 grave markers with dates ranging from the 1870's to the 1930's. Previous channel modifications and improvements may have impacted both of these sites. Previous investigations provide information valuable for predicting the kinds and numbers of cultural resources which may be expected to occur within the project area and in other similar settings.

5.2.4.5.2. Effects of No Action. Channel maintenance or modification by non-federal entities has been conducted along the lower reaches of Beaver Bayou. The continuation of this program would presumably continue without federal involvement. Potentially significant archeological sites located along Beaver Bayou could be affected by future maintenance or modification projects. Without such a program, channel migration could expose and eventually erode as yet unrecorded potentially significant cultural resources.

5.2.4.5.3. Effects of Plans BBN-P1, P2, and P3. The proposed plan for Beaver Bayou consists of widening approximately 7.8 miles of channel designed to convey a 10, 25, or

50-year storm event within stream banks for each respective plan. Plans to widen the existing channel could severely impact any cultural resources located within the project area.

Cultural resources investigations have been completed for much of the project area. Investigations are required for the portion of Beaver Bayou from Hooper to Hubbs Roads. There are two sites recorded on Beaver Bayou downstream from Hooper Road. The National Register status of both the Biltmore site (16EBR66) and Shanks Cemetery is unknown. Only a portion of the cemetery is thought to be located within the project area however, right-of-way limits have not been established for this location.

Previous investigations indicate that the project area has a low probability for containing significant cultural resources. Although no significant cultural resources are expected to occur within previously unsurveyed portions of the project area the survey is recommended due to the severity of anticipated project impacts from widening. Two previously recorded sites, 16EBR66 and Shanks Cemetery have not been evaluated in terms of their National Register significance. If these sites are found to be within the area of project impact, efforts will be made to determine their significance and assess any project impacts during the design phase of the project. The SHPO has been informed of these recommendations (Appendix G).

5.2.4.6. RECREATION RESOURCES

5.2.4.6.1. Significance. This is the same as for this category under Jones Creek.

5.2.4.6.2. Effects of No Action. This is the same as for this category under Jones Creek.

5.2.4.6.3. Effects of Plan BBN-P1. This is the same as for this category under Plan WCC-P4A5.

5.2.4.6.4. Effects of Plan BBN–P2. This is the same as for this category under Plan BBN-P1.

5.2.4.6.5. Effects of Plan BBN–P3. This is the same as for this category under Plan BBN-P1.

5.2.4.7. AESTHETICS

5.2.4.7.1. Significance. This is the same as for this category under Jones Creek.

5.2.4.7.3. Effects of Plan BBN–P1. Impacts to existing aesthetics and proposed mitigation techniques are similar to this category as under the Jones Creek plan, with the exception

that only trees are proposed. This creek is located in a rural setting where adjacent shrub, vine, and ground cover vegetation flourishes. In time, understory vegetation would encroach and voluntarily establish within the impacted corridor. Approximately 10.75 of stream bank vegetation would be lost along both sides of the upper bank of Beaver Bayou within the impacted area of channel enlargement. The hardwood tree plantings along that affected area would mitigate the lost aesthetic quality. Appendix E, Section 2 fully describes the details of the aesthetic mitigation planning.

5.2.4.7.4. Effects of Plan BBN–P2. Impacts to existing aesthetics and proposed mitigation are similar to the Beaver Bayou BBN–P1 plan. However, stream bank channel enlargement areas are different in magnitude than those above. Aesthetic mitigation through tree plantings would be adjusted according to the degree of impacts.

5.2.4.7.5. Effects of Plan BBN–P3. This is the same as for this category under Plan BBN–2 plan.

5.2.4.8. NOISE

5.2.4.8.1. Significance. This is the same as for this category under Jones Creek.

5.2.4.8.2. Effects of No Action. This is the same as for this category under Jones Creek.

5.2.4.8.3. Effects of Plans BBN-P1, P2, and P3. This is essentially the same as for this category under Jones Creek. The total duration for project construction is projected to be approximately 24 months for each of the alternatives.

5.2.4.9. VECTORS

5.2.4.9.1. Significance. This is the same as for this category under Jones Creek.

5.2.4.9.2. Effects of No Action. This is the same as for this category under Jones Creek.

5.2.4.9.3. Effects of all Plans. This is the same as for this category under Jones Creek.

5.2.4.10. SOCIOECONOMIC RESOURCES

The purpose of this section is to describe the more significant social and economic conditions of the area and to identify potential impacts of various project alternatives, including no Federal action.

5.2.4.10.1. Land Use.

5.2.4.10.1.1. Significance. This the same as for this category under Jones Creek.

5.2.4.10.1.2. Effects of No Action. The general effects of no action would include the continued level of flood hazard in the Beaver Bayou Watershed. Table 5-2-4-10-1 shows 1985 land use for this watershed. The trend of urban growth can be expected to continue through the continued conversion of agricultural and forest lands, influenced in part by the level of flood protection.

TABLE 5-2-4-10-1
Beaver Bayou Watershed 1985 Land Use

Urban	2,798 acres
Agriculture	3,629 acres
Forest	3,881 acres
Water	30 acres
Wetlands	28 acres
Other	107 acres
Totals	7,927 acres

The trend of urban growth can be expected to continue through the continued conversion of agricultural and forest lands, influenced in part by the level of flood protection.

5.2.4.10.1.3. Effects of Plan BBN-P1. The immediate effects of the above plan on land use would be a reduction in the current level of flood hazard that threatens developments in the less protected areas of the watershed, primarily residential developments. There are no direct changes in land use due to project construction.

5.2.4.10.1.4. Effects of Plan BBN-P2. Impacts would be similar to Plan BBN-P1. An increase in channel size would reduce the flood hazard slightly more.

5.2.4.10.1.5. Effects of Plan BBN-P3. Impacts would be similar to Plan BBN-P1. An increase in channel size would reduce the flood hazard slightly more.

5.2.4.10.2. Housing.

5.2.4.10.2.1. Significance. This is the same as for this category under Jones Creek.

5.2.4.10.2.2. Effects of No Action. The effect of no action, or the lack of any other flood control program, would result in the continued periodic flooding of those houses within the watershed that have inadequate flood protection. Recent surveys of this watershed indicate that approximately 604 residential structures have floor elevations at or below the current 100-year level of flood protection. Current insurance programs for homeowners encourage new construction to provide greater protection.

5.2.4.10.2.3. Effects of Plan BBN-P1. Completion of this plan would reduce the threat of flooding within the watershed. With the project in place, the number of residential structures with floor elevations at or below the 100-year level of protection would decline from 604 to 353.

5.2.4.10.2.4. Effects of Plan BBN-P2. Impacts would be similar to Plan BBN-P1. With a larger channel size, only 286 residential structures would have floor elevations at or below the 100-year flood level.

5.2.4.10.2.5. Effects of Plan BBN-P3. Impacts would be similar to Plan BBN-P1. With a larger channel size, only 275 residential structures would have flood elevations at or below the 100-year flood level.

5.2.4.10.3. Property Value.

5.2.4.10.3.1. Significance. This is the same as for this category under Jones Creek.

5.2.4.10.3.2. Effects of No Action. This is the same as for No Action in Jones Creek.

5.2.4.10.3.3. Effects of Plan BBN-P1. The drainage improvements offered by this plan would tend to raise the value of existing developments where the potential for flood damage is the greatest. The value of undeveloped areas would also tend to rise.

5.2.4.10.3.4. Effects of Plan BBN-P2. Impacts would be similar to Plan BBN-P1.

5.2.4.10.3.5. Effects of Plan BBN-P3. Impacts would be similar to Plan BBN-P1.

5.2.4.10.4. Business and Industry.

5.2.4.10.4.1. Significance. This is the same as for this category under Jones Creek.

5.2.4.10.4.2. Effects of No Action. This is the same as for No Action in Jones Creek.

5.2.4.10.4.3. Effects of Plan BBN-P1. Improved flood protection would reduce physical damages to businesses and industries, as well as reduce possible disruption of normal business activities, with an accompanying income loss.

5.2.4.10.4.4. Effects of Plan BBN-P2. Impacts would be similar to Plan BBN-P1.

5.2.4.10.4.5. Effects of Plan BBN-P3. Impacts would be similar to Plan BBN-P1.

5.2.4.10.5. Employment.

5.2.4.10.5.1. Significance. This is the same as for this category under Jones Creek.

5.2.4.10.5.2. Effects of No Action. This is the same as for No Action in Jones Creek.

5.2.4.10.5.3. Effects of Plan BBN-P1. Employment generated by construction of the project would tend to be temporary. In addition to this employment, the improved flood protection would indirectly help control economic development costs and enhance employment opportunities.

5.2.4.10.5.4. Effects of Plan BBN-P2. Impacts would be similar to Plan BBN-P1.

5.2.4.10.5.5. Effects of Plan BBN-P3. Impacts would be similar to Plan BBN-P1.

5.2.4.10.6. Community and Regional Growth.

5.2.4.10.6.1. Significance. This is the same as for this category under Jones Creek.

5.2.4.10.6.2. Effects of No Action. This watershed, located to the northeast of urbanized Baton Rouge, is one of the more rural watersheds in the parish. It is not expected to grow as fast as the watersheds i the southern half of the parish that are located along the Interstate Highways. ion of this watershed. Its nearness to the urbanized areas should insure some growth.

5.2.4.10.6.3. Effects of Plan BBN-P1. Improved drainage throughout the watershed would facilitate whatever growth might occur.

5.2.4.10.6.4. Effects of Plan BBN-P2. Impacts would be similar to Plan BBN-P1.

5.2.4.10.6.5. Effects of Plan BBN-P3. Impacts would be similar to Plan BBN-P1.

5.2.4.10.7. Displacement of People.

5.2.4.10.7.1. Significance. As discussed in the section on Housing, some 604 residential structures are located within the 100-year flood zone. Assuming the size of an average household within this zone is about the same as an average household in East Baton Rouge Parish as reported in the 1990 Census, or 2.65 persons, the total population living within this 100-year flood zone is about 1,600.

5.2.4.10.7.2. Effects of No Action. The periodic flooding of some residences within this watershed could cause those living in the lower elevations to move, seeking shelter in more protected areas.

5.2.4.10.7.3. Effects of Plan BBN-P1. Assuming the average number of persons per household within the 100-year flood zone would be 2.65 (similar to the 1990 Census number for East Baton Rouge Parish), this plan would reduce the total number of people in the 100-year floodplain from 1,600 to 935, a reduction of 665.

5.2.4.10.7.4. Effects of Plan BBN-P2. The impacts would be similar to Plan BBN-P1. An estimated 840 people currently living in the 100-year flood zone would no longer be subject to floods of this frequency and possible displacement.

5.2.4.10.7.5. Effects of Plan BBN-P3. The impacts would be similar to Plan BBN-P1. An estimated 870 people currently living in the 100-year flood zone would no longer be subject to floods of this frequency and possible displacement.

5.2.4.10.8. Displacement of Farms.

5.2.4.10.8.1. Significance. This is the same as for this category under Jones Creek.

5.2.4.10.8.2. Effects of No Action. This watershed is near the eastern edge of East Baton Rouge Parish and, thus, it is more rural in character than those watersheds closer to downtown Baton Rouge. The 1978 agricultural acreage of 3,725 has decreased only to 3,629 in 1985. Some decrease in this acreage is expected due to conversion to urban land even without a project.

5.2.4.10.8.3. Effects of Plan BBN-P1. Improved flood protection would probably have a minimal impact on farms in this watershed. Construction features of this plan would not impact any agricultural land, however, 89 acres, zoned as farmland, would be converted to permanently forested land with implementation of the offsite mitigation feature.

5.2.4.10.8.4. Effects of Plan BBN-P2. Impacts would be similar to Plan BBN-P1 with 87 acres of zoned farmland required for offsite mitigation.

5.2.4.10.8.5. Effects of Plan BBN-P3. Impacts would be similar to Plan BBN-P1 with 90 acres of zoned farmland required for offsite mitigation.

5.2.4.10.9. Public Facilities and Services.

5.2.4.10.9.1. Significance. This is the same as for this category under Jones Creek.

5.2.4.10.9.2. Effects of No Action. The expansion of public facilities and services would follow any future population growth. This growth is expected to be slow.

5.2.4.10.9.3. Effects of Plan BBN-P1. Improved flood protection should facilitate the slow growth in this watershed along with an increase in demand for public facilities and services. The channel enlargement in this plan would require the relocation of 6 bridges, 4 pipelines, 3 waterlines, and 5 culverts.

5.2.4.10.9.4. Effects of Plan BBN-P2. Similar impacts to Plan BBN-P1.

5.2.4.10.9.5. Effects of Plan BBN-P3. Similar impacts to Plan BBN-P1.

5.2.4.10.10. Tax Revenues.

5.2.4.10.10.1. Significance. This is the same as for this category under Jones Creek.

5.2.4.10.10.2. Effects of No Action. This is the same as for No Action in Jones Creek.

5.2.4.10.10.3. Effects of Plan BBN-P1. Improved flood protection could attract development in areas where protection is currently marginal or inadequate. The increased development and improved protection would help to maintain the stability of the tax base.

5.2.4.10.10.4. Effects of Plan BBN-P2. Similar impacts to Plan BBN-P1.

5.2.4.10.10.5. Effects of Plan BBN-P3. Similar impacts to Plan BBN-P1.

5.2.4.10.11. Community Cohesion.

5.2.4.10.11.1. Significance. This is the same as for this category under Jones Creek.

5.2.4.10.11.2. Effects of No Action. This is the same as for No Action in Jones Creek.

5.2.4.10.11.3. Effects of Plan BBN-P1. Minimal impact to community cohesion as flood protection is improved with very little environmental change.

5.2.4.10.11.4. Effects of Plan BBN-P2. Similar impacts to Plan BBN-P1.

5.2.4.10.11.5. Effects of Plan BBN-P3. Similar impacts to Plan BBN-P1.

5.2.5. **Blackwater Bayou Basin**

5.2.5.1. AGRICULTURAL LANDS

5.2.5.1.1. Significance. This is the same as for this category under Jones Creek.

5.2.5.1.2. Effects of No Action. This is the same as for this category under Jones Creek.

5.2.5.1.3. Effects of Plan BW-P2. This is essentially the same as for this category under Jones Creek, but implementation of mitigation for this alternative would consist of the conversion of prime and unique farmlands equal to approximately 32 percent of the combined mitigation plan conversion.

5.2.5.1.3. Effects of Plan BW-P4. This is essentially the same as for Plan BF10-A, but implementation of mitigation for this alternative would consist of the conversion of prime and unique farmlands equal to approximately 55 percent of the combined mitigation plan conversion.

5.2.5.2. BOTTOMLAND HARDWOOD FORESTS

5.2.5.2.1. Significance. This is the same as for this category under Jones Creek.

5.2.5.2.2. Effects of No Action. This is the same as for this category under Jones Creek.

5.2.5.2.3. Effects of Plan BW-P2. This is essentially the same as for this category under Beaver Bayou Plan BBN-P1, but 77 acres and 48 HUVs would be lost due to construction of flood control features. These losses would be fully compensated with the habitat mitigation plan. A total of 127.85 AAHU's would be lost for all evaluation species as determined by the HEP for this alternative.

5.2.5.2.3. Effects of Plan BW-P4. This is the same as for Plan BW-P2, but 141 acres and 88 HUVs would be lost by flood control features caused by additional construction required for the higher level of protection.

5.2.5.3. THREATENED AND ENDANGERED SPECIES

5.2.5.3.1. Significance. This is the same as for this category under Jones Creek.

5.2.5.3.2. Effects of No Action. This is the same as for this category under Jones Creek and Beaver Bayou.

5.2.5.3.3. Effects of Plan BW-P2. This is essentially the same as for this category under Beaver Bayou Plan BBN-P1. However, with no action to prevent it, a projected 145,000 cubic yards of materials would accumulate within and near the mouth of the main channel and its tributary. Again, the geotextile mat mentioned for Beaver Bayou would also be utilized in this watershed to minimize this projected erosion. The transport capacity of the Comite River is sufficient to distribute any sediments that would eventually be introduced into it by the implementation of this alternative. Likewise, the transport capacity of the Amite River is sufficient to move any sediments eventually introduced into it by the Comite River. Therefore, the inflated heelsplitter would not be affected by the implementation of this alternative.

5.2.5.3.4. Effects of Plan BW-P4. This is the same as for Plan BBN-P2.

5.2.5.4. AQUATIC RESOURCES

5.2.5.4.1. Water Quality Features

5.2.5.4.1.1. Significance. This is the same as for this category under Jones Creek. However, this watercourse begins in an agricultural and forested area rather than an urban area. Therefore, the quality of source waters is higher than the previous basins of the overall study area discussed.

5.2.5.4.1.2. Effects of No Action. This is the same as for this category under Jones Creek.

5.2.5.4.1.3. Effects of Plan BW-P2. This is similar for this category as that for Beaver Bayou BBN-P1. However, 13.4 miles of this watercourse and a tributary would receive channel enlargement.

5.2.5.4.1.3. Effects of Plan BW-P4. This is the same as for this category under Plan BW-P2 other than for the different level of protection.

5.2.5.4.2. Ecological Features

5.2.5.4.2.1. Significance. This is the same as for this category under Jones Creek. However, because of higher water quality, the source waters are higher in ecological value than the previous basins of the overall study area discussed.

5.2.5.4.2.2. Effects of No Action. This is the same as for this category under Jones Creek.

5.2.5.4.2.3. Effects of Plan BW-P2. This is similar for this category as that for Beaver Bayou Plan BBN-P1. As with that alternative, all work would consist of channel enlargement.

5.2.5.4.2.4. Effects of Plan BW-P4. This is the same for this category as for Blackwater Bayou Plan BW-P2 other than for the different level of protection.

5.2.5.5. CULTURAL RESOURCES

5.2.5.5.1. Significance. The proposed plan for Blackwater Bayou and its main tributary consists of widening approximately 13.4 miles of channel designed to convey a 10-year storm event within stream bank. Plans to widen the channel could severely impact any cultural resources located within the project area. Investigations conducted during the feasibility study indicate that similarities exist in the number and kinds of cultural resources found along both Blackwater and Beaver bayous (Goodwin et al. 1990). The project area is considered to have a low probability for containing significant cultural resources. The Blackwater Bayou Site (16EBR33) and 16EBR66 on Beaver Bayou, appear similar in age and presumed function also. Both sites appear to represent campsites which date from the Paleo-Indian or Early Archaic period. Impacts at 16EBR33 include both residential construction and drainage improvements. The National Register eligibility has not been determined for this site.

5.2.5.5.2. Effects of No Action. Channel migration could expose and eventually erode potentially significant cultural resources.

5.2.5.5.3. Effects of Plan BW-P2 and BW-P4. Similarities to Beaver Bayou indicate the project area has a low probability for containing significant cultural resources. However, intensive investigations should be undertaken prior to the next phase of work. The proposed project has potential for adversely affecting one previously recorded potentially significant archeological site (16EBR33). An attempt should be made to identify site limits with relation to the project boundaries and make a final determination of eligibility prior to construction of the project features. The SHPO has been informed of these recommendations (Appendix G).

5.2.5.6. RECREATION RESOURCES

5.2.5.6.1. Significance. This is the same as for this category under Jones Creek.

5.2.5.6.2. Effects of No Action. This is the same as for this category under Jones Creek.

5.2.5.6.3. Effects of Plan BW–P2. This is the same as for this category under Plan WCC–P4A5.

5.2.5.6.4. Effects of Plan BW–P4. This is the same as for this category under Plan BW-P2.

5.2.5.7. AESTHETICS

5.2.5.7.1. Significance. This is the same as for this category under Jones Creek.

5.2.5.7.2. Effects of No Action. This is the same as for this category under Jones Creek.

5.2.5.7.4. Effects of Plan BW–P2. Impacts to existing aesthetics and proposed mitigation are similar to Plan BBN–P1. However, the extent of stream bank channel enlargement areas is different. The 13.5 miles of tree plantings would mitigate the losses of these resources.

5.2.5.7.5. Effects of Plan BW–P4. This is the same as for this category under Plan BW–P2 plan.

5.2.5.8. NOISE

5.2.5.8.1. Significance. This is the same as for this category under Jones Creek.

5.2.5.8.2. Effects of No Action. This is the same as for this category under Jones Creek.

5.2.5.8.3. Effects of Plan BW-P2. This is essentially the same as for this category under Jones Creek. The total duration for project construction is projected to be approximately 18 months.

5.2.5.8.4. Effects of Plan BW-P4. This is the same as for this category as under Plan BW-P2.

5.2.5.9. VECTORS

5.2.5.9.1. Significance. This is the same as for this category under Jones Creek.

5.2.5.9.2. Effects of No Action. This is the same as for this category under Jones Creek.

5.2.5.9.3. Effects of All Plans. This is the same as for this category under Jones Creek.

5.2.5.10. SOCIOECONOMIC RESOURCES

The purpose of this section is to describe the more significant social and economic conditions of the area and to identify potential impacts of various project alternatives, including no Federal action.

5.2.5.10.1. Land Use.

5.2.5.10.1.1. Significance. This the same as for this category under Jones Creek.

5.2.5.10.1.2. Effects of No Action. The general effects of no action would include the continued level of flood hazard in the Blackwater Bayou Watershed. Table 5-2-5-10-1 shows 1985 land use for this watershed. The trend of urban growth can be expected to continue through the continued conversion of agricultural and forest lands, influenced in part by the level of flood protection.

5.2.5.10.1.3. Effects of Plan BW-P2. The immediate effects of the above plan on land use would be a reduction in the current level of flood hazard that threatens developments in the less protected areas of the watershed, primarily residential developments. There are no direct changes in land use due to project construction.

TABLE 5-2-5-10-1
Blackwater Bayou Watershed 1985 Land Use

Urban	2,882 acres
Agriculture	3,716 acres
Forest	2,743 acres
Water	0 acres
Wetlands	0 acres
Other	0 acres
Totals	9,341 acres

5.2.5.10.1.4. Effects of Plan BW-P4. Impacts would be similar to Plan BW-P2.

5.2.5.10.2. Housing.

5.2.5.10.2.1. Significance. This is the same as for this category under Jones Creek.

5.2.5.10.2.2. Effects of No Action. The effect of no action, or the lock of any other flood control program, would result in the continued periodic flooding of those houses within the

watershed that have inadequate flood protection. Recent studies of this watershed indicate that approximately 866 residential structures have floor elevations at or below the current 100-year level of flood protection. Current insurance programs for homeowners encourage new construction to provide greater protection.

5.2.5.10.2.3. Effects of Plan BW-P2. Completion of this plan would substantially reduce the threat of flooding within the watershed. With the project in place, the number of residential structures with floor elevations at or below the 100-year level of protection would decline from 866 to 642.

5.2.5.10.2.4. Effects of Plan BW-P4. Impacts would be similar to Plan BW-P2 with a slightly greater reduction of the flood threat, since this channel would accommodate a larger flow. This plan would leave approximately 461 residential structures at or below the 100-year level of protection.

5.2.5.10.3. Property Value.

5.2.5.10.3.1. Significance. This is the same as for this category under Jones Creek.

5.2.5.10.3.2. Effects of No Action. This is the same as for No Action in Jones Creek.

5.2.5.10.3.3. Effects of Plan BW-P2. The drainage improvements offered by this plan would tend to raise the value of existing developments where the potential for flood damages is the greatest. The value of undeveloped areas would also tend to rise.

5.2.5.10.3.4. Effects of Plan BW-P4. Impacts would be similar to Plan BW-P2.

5.2.5.10.4. Business and Industry.

5.2.5.10.4.1. Significance. This is the same as for this category under Jones Creek.

5.2.5.10.4.2. Effects of No Action. This is the same as for No Action in Jones Creek.

5.2.5.10.4.3. Effects of Plan BW-P2. Improved flood protection would reduce physical damages to businesses and industries, as well as reduce possible disruption of normal business activities, with an accompanying income loss.

5.2.5.10.4.4. Effects of Plan BW-P4. Impacts would be similar to Plan BW-P2.

5.2.5.10.5. Employment.

5.2.5.10.5.1. Significance. This is the same as for this category under Jones Creek.

5.2.5.10.5.2. Effects of No Action. This is the same as for No Action in Jones Creek.

5.2.5.10.5.3. Effects of Plan BW-P2. Employment generated by construction of the project would tend to be temporary. In addition to this employment, the improved flood protection would indirectly help control overall economic development costs and enhance employment opportunities.

5.2.5.10.5.4. Effects of Plan BW-P4. Impacts would be similar to Plan BW-P2.

5.2.5.10.6. Community and Regional Growth.

5.2.5.10.6.1. Significance. This is the same for this category as under Jones Creek.

5.2.5.10.6.2. Effects of No Action. As this watershed is one of the more rural in the parish. not as much growth is expected as in those watersheds along the two interstate highways. However, some growth would occur even without additional flood protection.

5.2.5.10.6.3. Effects of Plan BW-P2. Improved drainage throughout the watershed would facilitate whatever growth might occur.

5.2.5.10.6.4. Effects of Plan BW-P4. Impacts would be similar to Plan BW-P2.

5.2.5.10.7. Displacement of People.

5.2.5.10.7.1. Significance. As discussed in the section on Housing, some 800 residential structures are located within the 100-year flood zone. Assuming that the size of an average household within this zone is about the same as an average household in East Baton Rouge Parish as reported in the 1990 Census, or 2.65 persons, the total population living within this 100-year flood zone is about 2,120.

5.2.5.10.7.2. Effects of No Action. This is the same as for No Action under Jones Creek.

5.2.5.10.7.3. Effects of Plan BW-P2. Assuming the average number of persons per household within the 100-year flood zone would be 2.65 (similar to the 1990 Census numbers for East Baton Rouge Parish), this plan would reduce the total number of people in the 100-year floodplain from 2,300 to 1,675, a reduction of 625.

5.2.5.10.7.4. Effects of Plan BW-P4. The impacts would be similar to Plan BW-P2. An estimated 1,100 people currently living in the 100-year flood zone would no longer be subject to floods of this frequency and possible displacement.

5.2.5.10.8. Displacement of Farms.

5.2.5.10.8.1. Significance. This is the same as for this category under Jones Creek.

5.2.5.10.8.2. Effects of No Action. Over 3,700 acres of agricultural land remain in this watershed. Even under without-project conditions, a further decrease is expected as the population grows and changes in technology continue.

5.2.5.10.8.3. Effects of Plan BW-P2. Improved flood protection would probably have a minimal impact on farms in this watershed. Construction features of this plan would not impact any agricultural land, however, 90 acres zoned as farmland would be converted to permanently forested land with implementation of the offsite mitigation feature.

5.2.5.10.8.4. Effects of Plan BW-P4. Impacts are similar to Plan BW-P2. Construction features would not impact any agricultural land, however, as this plan involves greater channel enlargement, more farmland acres (154) will be set aside for offsite mitigation purposes.

5.2.5.10.9. Public Facilities and Services.

5.2.5.10.9.1. Significance. This is the same as for this category under Jones Creek.

5.2.5.10.9.2. Effects of No Action. The expansion of public facilities and services would follow any future population growth. This growth is expected to be very slow.

5.2.5.10.9.3. Effects of Plan BW-P2. Improved flood protection should facilitate the slow growth in this watershed along with an increase in demand for public facilities and services. The channel enlargement in this plan would require the relocation of 11 bridges, 5 pipelines, and 2 power lines.

5.2.5.10.9.4. Effects of Plan BW-P4. Similar impacts to Plan BW-P2.

5.2.5.10.10. Tax Revenues.

5.2.5.10.10.1. Significance. This is the same as for this category under Jones Creek.

5.2.5.10.10.2. Effects of No Action. This is the same as for No Action in Jones Creek.

5.2.5.10.10.3. Effects of Plan BW-P2. Improved flood protection could attract development in areas where protection is currently marginal or inadequate. The increased development and improved protection would help to maintain the stability of the tax base.

5.2.5.10.10.4. Effects of Plan BW-P4. Similar impacts to Plan BW-P2.

5.2.5.10.11. Community Cohesion.

5.2.5.10.11.1. Significance. This is the same as for this category under Jones Creek.

5.2.5.10.11.2. Effects of No Action. This is the same as for No Action in Jones Creek.

5.2.5.10.11.3. Effects of Plan BW-P2. Minimal impact to community cohesion as flood protection is improved with very little environmental change.

5.2.5.10.11.4. Effects of Plan BW-P4. Similar impacts to Plan BW-P2.

5.3. CUMULATIVE IMPACTS.

Population growth of the parish has slowed in recent years as compared to the rapid growth of the 1950's through early 1980's with the decline of the oil industry. A growth rate of 0.6 percent is projected to occur between 1986 and 2047. Development involving the clearing of wooded lands under the future without project condition will result in little changes in the older parts of Baton Rouge simply because there is little left to develop. Development of the northern area will likely continue to be slow, but development of the southern portion, however, will result in the rapid conversion of wooded and agricultural lands to residential and commercial use because the demand for land is so great. The past and projected conversion of wooded land to urban uses within the total parish, and the different portions, is reflected in Table 5-2-1-2-1. The city/parish has developed what is called The Horizon Plan to assist in planned growth and development. The Horizon Plan incorporates numerous concepts, one of which is drainage, and was adopted by the city/parish council in 1992.

The total of 280 acres of wooded land converted to flood control channels by the sum of the Tentatively Selected Plans for each of the watersheds described in this report would be a part of the total, but would consist of a minimal portion of the total wooded land converted in the parish during the time of construction. However, the conversion of approximately 397 acres of cleared land to wooded land as proposed by the habitat mitigation plan would actually result in a net increase, as a result of the proposed action, in the total amount of wooded land in the parish. Various flood control activities planned by the city/parish but awaiting funding would be additive to, but not part of, the proposed action. These actions consist of replacements of culverts or bridges, additional clearing and snagging or enlargement of channels, and similar activities. Some adverse impacts would accrue to the aquatic and terrestrial resources including wetland functions as a result of these actions in the process of achieving positive social and economic impacts.

6. LIST OF PREPARERS

The following people were primarily responsible for preparing this statement.

NAME	DISCIPLINE EXPERTISE	EXPERIENCE	ROLE IN EIS
Mr. William Wilson	Wildlife Biology	6 Yrs, Wildlife Biol., Georgia DNR; 15 Yrs, Biologist, NOD	EIS Coordinator; Effects on Agri lands, BLH forests, T&E species, Aquatic Resources (Ecol.), Noise, Vectors
Mr. Francis Vicidomina	Civil Engineer	14 Yrs, Civil Engineering, NOD	Study Manager
Mr. Timothy Lookingbill	Economics	28 Yrs, Regional Economist, NOD	Project Benefits, Effects on Socioeconomics
Mr. Stephen Finnegan	Aesthetics Recreation	17 Yrs, Landscape Architect, NOD	Effects on Aesthetics, Recreation
Mr. James Wojtala	Archeology	17 Yrs, Archeologist, 3 Yrs NOD	Effects on Cultural Resources
Mr. Bill Hicks	Hydraulic / Environmental Engineer	5 Yrs Civil, 2 Yrs Environmental Engineering, NOD	Effects on Aquatic Resources (Water Quality), Water Quality Section of Engnrng Appendix
Ms. Cheryl G. Peyton, P.E.	Hydraulic Engineer	4 Yrs Civil, 4 Yrs Environmental Engineer, 2 Yrs NOD	HTRW Appendix
Ms. Julie Z. LeBlanc, P.E.	Hydraulic Engineer	3 Yrs Civil, Priv. Indus; 2 Yrs Hyrdraulic Engnr, NOD	404(b)(1) (Physical features); HTRW Appendix
Mr. Falcolm Hull	Civil Engineer	20 Yrs, Civil Engineering; Study Mngr, NOD	Study Supervision Land Use Appendix
Mr. Nicholas Constan	Economist	23 Yrs, Regional Economist, NOD	Overall Economic Review
Mr. David Carney	Wildlife Biology	1 Yr, Biologist, USFWS; 15 Yrs, Biologist, NED & NOD	Overall Environmental Review

7. PUBLIC INVOLVEMENT, REVIEW, AND CONSULTATION

7.1. PUBLIC INVOLVEMENT PROGRAM

The initial public meeting was held October 30, 1984, in Baton Rouge, Louisiana, to allow the public to comment on the plans developed in the Initial Evaluation Report. Scoping for this EIS was begun with the mailing of a scoping input request dated March 4, 1988 to all on the mailing list for the project. Major concerns resulting from that mailing including prompt implementation of flood control measures, alternatives, fish and wildlife habitat protection, and non-structural alternatives. Letters received from the following agencies or individuals were as follows: from Federal agencies - four; from local government - two; from local business - one; from environmental groups - one; and from private citizens - five. Between 1988 and 1993 meetings have been held with environmental groups, Federal and state government, and with local City/Parish government. Close coordination has been maintained with the Amite River Basin Drainage and Water Conservation District (ARBWCD). Corps of Engineers personnel have attended their meetings. Corps personnel have met with local mayors, state legislators, Baton Rouge Chamber of Commerce, East Baton Rouge City/Parish Department of Public Works, Louisiana Department of Wildlife and Fisheries, Louisiana Department of Environmental Quality, Louisiana Department of Transportation and Development, and Louisiana Department of Agriculture and Forestry. For a more complete discussion of the public involvement program, see the Section entitled Summary of Coordination, Public Views, and Comments within the Feasibility Report.

7.2. REQUIRED COORDINATION / COMPLIANCE

7.2.1. <u>General</u>. As indicated in the previous paragraph, close coordination has been maintained with several local, state, and Federal agencies. Major statutes for which compliance has been achieved or will be achieved are included in the following paragraphs.

7.2.2. <u>National Environmental Policy Act</u>. The following activities have been or are in the process of being accomplished: filing of a notice of intent in the Federal Register on February 12, 1988; scoping as indicated Paragraph 7.1 above; publishing this document and incorporation of comments from public review including a public meeting into a Final Environmental Impact Statement (FEIS); and, finally, preparation and signing of a Record of Decision.

7.2.3. <u>Clean Air Act</u>. Review of this statement by the Environmental Protection Agency achieves compliance.

7.2.4. Clean Water Act. A 404(b)(1) Evaluation is prepared for the portions of the overall project for which materials will be deposited into waters of the United States. Project compliance with 404(r) requirements has been achieved, however, the District will pursue State of Louisiana Water Quality Certification, instead. Application has been made to the Louisiana Department of Environmental Quality for certification of the Tentatively Selected Plan for each of the watersheds.

7.2.5. Coastal Zone Management Act. Minimally applicable in this parish.

7.2.6. National Historic Preservation Act. Preliminary cultural resources investigations have been coordinated with the State Historic Preservation Office (SHPO). Plans to conduct additional investigations are being coordinated with the SHPO. All necessary cultural resources studies and coordination will be completed prior to construction.

7.2.7. Fish and Wildlife Coordination Act. Regular communication has been maintained with the US Fish and Wildlife Service (USFWS) as well as the Louisiana Department of Wildlife and Fisheries. The report of the Secretary of the Interior (from the USFWS) is included in this report. Recommendations and the District responses are included in paragraph 7.4.

7.2.8. Endangered Species Act. Correspondence was initiated with all agencies responsible for administering the Act. Copies of the correspondence and any pertinent follow-up correspondence is included in Section 4 of Appendix E. One specific section of this EIS addresses the concerns of this statute.

7.2.9. Farmland Protection Policy Act. A request was made to the representative of the Soil Conservation Service regarding compliance with this statute. A copy of the rating form for the features of the project affecting land zoned as farmland is included in Section 6 of Appendix E.

7.2.10. Executive Order 11988, Floodplain Management. This order deals with minimizing or avoiding impacts associated with the base floodplain unless there is no practicable alternative. Public notice of possible Federal actions to be recommended within the floodplain was made at the public meeting of October 30, 1984, within the Notice of Intent to prepare an EIS, in the scoping packet mailed to interested individuals, and in this statement.

7.2.11. Executive Order 11990, Protection of Wetlands. This order was considered in planning. The decision to haul the dredged material to a landfill in three of the watersheds was based, in part, upon this order.

7.3. DRAFT STATEMENT RECIPIENTS.

Copies of the draft EIS are being mailed to those listed in Section 8 of Appendix E.

7.4. PUBLIC VIEWS AND RESPONSES

Public Involvement. The views expressed during the scoping period were considered in the planning process. Significant flood events of 1953, 1962, 1973, 1977, 1979, 1983, 1989, 1990, and 1993 resulted in significant public concern for corrective flood control action to be taken. Meetings with environmental groups revealed their concern for aesthetics and green areas within the urban area.

7.5. U.S. FISH AND WILDLIFE SERVICE (USFWS) RECOMMENDATIONS

The recommendations made by the USFWS in their Draft Coordination Act Report are listed below along with the Corps of Engineers responses.

1. To the extent feasible, flood control measures in Blackwater and Beaver Bayous, particularly in the lower reaches, should be limited to minimal clearing and snagging activities.

Response: The Tentatively Selected Plan proposed for Blackwater Bayou includes minimal modification from the mouth of the bayou at the Comite River upstream to Hooper Road. The Tentatively Selected Plan proposed for Beaver Bayou includes no channel modification from the Comite River upstream to Frenchtown Road.

2. Where sufficient space is available, channel rights-of-way impacted by channel enlargement should be revegetated immediately after construction is completed.

Response: The aesthetic mitigation plan will include, where space is available, the planting of hardwood trees and shrubs on Jones Creek, Ward Creek, and Bayou Fountain, and trees only on Beaver and Blackwater Bayous. This would be in addition to any habitat mitigation. Channel slopes would be planted with grass seed to establish a turf immediately after construction is completed.

3. Project impacts to fish and wildlife resources should be mitigated by either a) purchasing and implementing timber stand improvement measures on 319 acres of land adjacent to Bayou Duplantier, from the Stanford Avenue crossing to its confluence with Dawson Creek; or b) purchasing and reforesting 436 acres of open land, in one parcel or scattered tracts, located adjacent to land(s) currently owned by the Baton Rouge Recreation and Park Commission. These lands should be located within floodplain areas with hydrology similar to that of the project channels.

Response: Currently the recommended mitigation plan, which is the product of an attempt to develop consensus of the Corps and Service's evaluation and compensation output, would include acquisition of 397 acres of land, 115 of which would be adjacent to one of the BREC parks, with the 282-acre residual area currently to be off Joor Road in the northern portion of the parish. We should not restrict the local sponsor to these two specific tracts, however, if other suitable sites become available at less costs. We concur with the concept that mitigation may be more cost effective to riparian species on sites adjacent to streams; however, this is based upon the assumption that land would be available and would be relatively inexpensive when actually it may not be inexpensive because of high acquisition and severance costs when dealing with numerous property owners. We do not recommend the acquisition of the tract of land adjacent to Bayou Duplantier because of high real estate costs.

4. Maintenance work conducted on impacted streams should be limited to instream clearing and snagging with hand-held equipment.

Response: The future conditions without any Federal action includes maintenance work consisting of regular herbicide applications to control instream tree growth and to produce channel banks lined with bermudagrass. This is currently being done on some basins and is planned for all basins. It would continue with implementation of any alternative. With any alternative in place, operation and maintenance would involve as-needed removal of large obstructions. Periodic selective clearing and snagging, i.e., maximizing the use of hand-held equipment, would be utilized to maintain the channels.

5. Prior to initiating any construction activities, the Fish and Wildlife Service (Service) should be consulted regarding threatened and endangered species, particularly the bald eagle, as there is a currently inactive nest in the vicinity of the work area.

Response: Concur.

LITERATURE CITED

Allen, A.W. 1986. Habitat suitability index models: mink, revised. U.S. Fish and Wildlife Service Biological Report 82(10.127). 23 pp.

Brinson, M.M., B.L. Swift, R.C. Plantico, and J.S. Barclay. 1981. Riparian ecosystems: their ecology and status. U.S. Fish and Wildlife Service. FWS/OBS-81/17. 154 pp.

Bryant, Douglas Donne. 1985. A Cultural Resources Survey of Beaver Bayou, East Baton Rouge Parish, Louisiana. Prepared by Coastal Environments for Department of Public Works, Baton Rouge.

Dance, R.E., B.J. Griffis, B.B. Nutt, A.G. White, S.A. Lytle, and J.E. Seaholm. 1968. Soil survey of East Baton Rouge Parish, Louisiana. USDA Soil Conservation Service. 80 pp.+

Fredrickson, L.H. 1980. Management of lowland hardwood wetlands for wildlife: problems and potential. Trans. N. Am. Wildl. Nat. Resource Conf. 45: 376-386.

Goodwin, R. Christopher, Stephen Hinks, William P. Athens, Lawrence L. Hewitt, and William A. Morgan. 1990. Literature Search and Research Design Amite River and Tributaries Project: Ascension, East Baton Rouge, and Livingston Parishes, Louisiana. Prepared by R. Christopher Goodwin and Associates, Inc. for the U.S. Army Corps of Engineers, New Orleans District.

Hartfield, P. 1988. Status survey for the Alabama heelsplitter mussel, Potamilus inflatus (Lea, 1831). A report to the U.S. Fish and Wildlife Service. 27 pp.+.

Hubert, W.A., and J.N. Krull. 1973. Seasonal fluctuations of aquatic macroinvertebrates in Oakwood Bottoms greentree reservoir. Am. Mid. Nat. 90: 177-185.

International Society of Arboriculture. 1989. Guide for establishing values of trees and other plants. Prepared by Council of Tree and Landscape Appraisers, Revision IV, International Society of Arboriculture, Urbana, Illinois. In Wenger, Karl F., ed., Forestry Handbook, Second Edition, John Wiley and Sons, New York, pp 979 - 980.

May, D.M. and D.F. Bertelson. 1986. Forest statistics for Louisiana parishes. US Forest Service. Southern Forest Experiment Station. Resource Bulletin SO-115. 59 pp.

Nunnally, N.R. and F.D. Shields. 1985. Incorporation of environmental features in flood control projects. U.S. Army Engineers Waterways Exp. Sta., Tech. Rpt. E-85-3. 232 pp +.

Stauffer, D.F. and L.B. Best. 1980. Habitat selection by birds of riparian communities: evaluating effects of habitat alterations. J. Wildl. Manage. 44 (1): 1-15.

Stern, E.M. 1976. The freshwater mussels (Unionidae) of the Lake Maurepas-Pontchartrain-Borgne drainage system, Louisiana and Mississippi. Ph.D. Dissertation, Louisiana State University, Baton Rouge, LA. 206 pp.

Thomas, C.E., and C.V. Bylin. 1982. Louisiana Mid-Cycle Survey Shows Change in Forest Resource Trends. Southern Forest Experiment Station. Resource Bulletin SO-86. 33 pp.

U.S. Army Corps of Engineers. 1990. Amite River and Tributaries, Louisiana: Comite River Basin. Feasibility Study and Environmental Impact Statement.

Wharton, C. H., W.M. Kitchens, E.C. Pendleton, and T.W. Sipe. 1982. The ecology of bottomland hardwood swamps of the southeast: a community profile. U.S. Fish and Wildlife Service. FWS/OBS-81-37. 133 pp.

Weinstein, Richard Alan. 1985. Archeological Investigations at the Lee Site, East Baton Rouge Parish, Louisiana. Prepared by Coastal Environments Inc. for Louisiana Division of Archeology, Department of Culture, Tourism, and Recreation. Baton Rouge.

TENTATIVE RECOMMENDATION

TENTATIVE RECOMMENDATION

As the District Engineer, I find that the tentatively selected plan as developed in this report is based on a comprehensive analysis and evaluation of all practicable alternatives to reduce flood damages in East Baton Rouge Parish. The plan produces net excess benefits over cost and has a favorable benefit-to-cost ratio. I have considered the significant environmental, social, and economic effects, the engineering feasibility, and the input received from the public and have determined that the plan is in the public interest.

I recommend that the existing project "Amite River and Tributaries, Louisiana" authorized by the Flood Control Act of 9 August 1955, be modified to provide additional flood protection by construction of channel modifications to five watersheds in East Baton Rouge Parish. These watersheds are Blackwater Bayou and its main Tributary, Beaver Bayou, Jones Creek and Tributaries, Ward Creek and Tributaries, and Bayou Fountain. The comprehensive plan consists of modifying approximately 66 total miles of channels. Modifications include approximately 25 miles of minimal clearing and snagging, 24 miles of earthen channel enlargement, and 17 miles of channel concrete lining. Included in the proposed construction are 60 miles of stream bank aesthetic tree plantings. Mitigation features consist of the reforestation of 397 acres of cleared land to compensate for an estimated 280 acres of bottomland hardwoods that would be lost to project construction. These acreages may be adjusted given the future availability of sites. Recreation features include an 11-mile bicycle path.

Further, I recommend construction to be subject to cost-sharing and financing arrangements with the responsible non-Federal agency, East Baton Rouge Parish, sponsoring the project that are satisfactory to the President and the Congress.

These recommendations are made with the provisions that prior to implementation, the non-Federal sponsor agrees to comply with the following requirements:

a. Provide all lands, easements, rights-of-way, excavated material disposal areas, as may be determined by the Government to be necessary for construction, operation, and maintenance of all features of the project;

b. Accomplish at no cost to the Government all relocations and removals of (excluding railroad bridges and approaches thereto) including pipelines, cables, and other facilities including drainage facilities required by the construction of the project, and alterations of buildings determined by the Government to be necessary for construction of the project;

c. Provide during the period of construction a cash contribution equal to 5 percent of total flood control project cost;

d. Provide such additional amount necessary so that the total contribution of non-Federal interest for structural flood control features of the project is not less than 25 percent of the cost of the project assigned to structural flood control;

e. Provide during the period of construction a cash contribution equal to 50 percent of the total cost of the recreation features;

f. Hold and save the United States free from damages due to the construction, operation, maintenance, and rehabilitation of the project, except where such damages are due to the fault or negligence of the United States or its contractors;

g. Assume responsibility for any legal liabilities resulting from transfer of water from one watershed to another;

h. Assume responsibility for operating, maintaining, replacing, repairing, and rehabilitating the project or completed elements thereof including mitigation and recreation features without cost to the Government, in accordance with regulations prescribed by the Secretary of the Army;

i. No less than once each year inform affected interests of the limitations of the protection afforded by the project;

j. Participate in and comply with applicable Federal floodplain management and flood insurance programs;

k. Publicize floodplain information in the area concerned and shall provide this information to zoning and other regulatory agencies for their guidance and leadership in preventing unwise future development in the floodplain and in

adopting such regulations as may be necessary to prevent unwise future development and to ensure compatibility with protection levels provided by the project;

l. Implement and enforce existing and required supplemental flood damage prevention ordinances in the Bayou Fountain watershed;

m. Exact ordinances and promulgate regulations prior to initiation of construction to prevent construction and encroachment on the proposed project works that would reduce their flood-carrying capacity or hinder maintenance and operation, and control development in the project area to prevent an undue increase in the flood damage potential;

n. Comply with the applicable provisions of the Uniform Relocations Assistance and Real Property Acquisition Policies Act of 1970, PL 91-646, approved January 2, 1971, in acquiring lands, easements, and rights-of-way for construction and subsequent operation and maintenance of the project, and inform all affected persons of applicable benefits, policies, and procedures in connection with said Act;

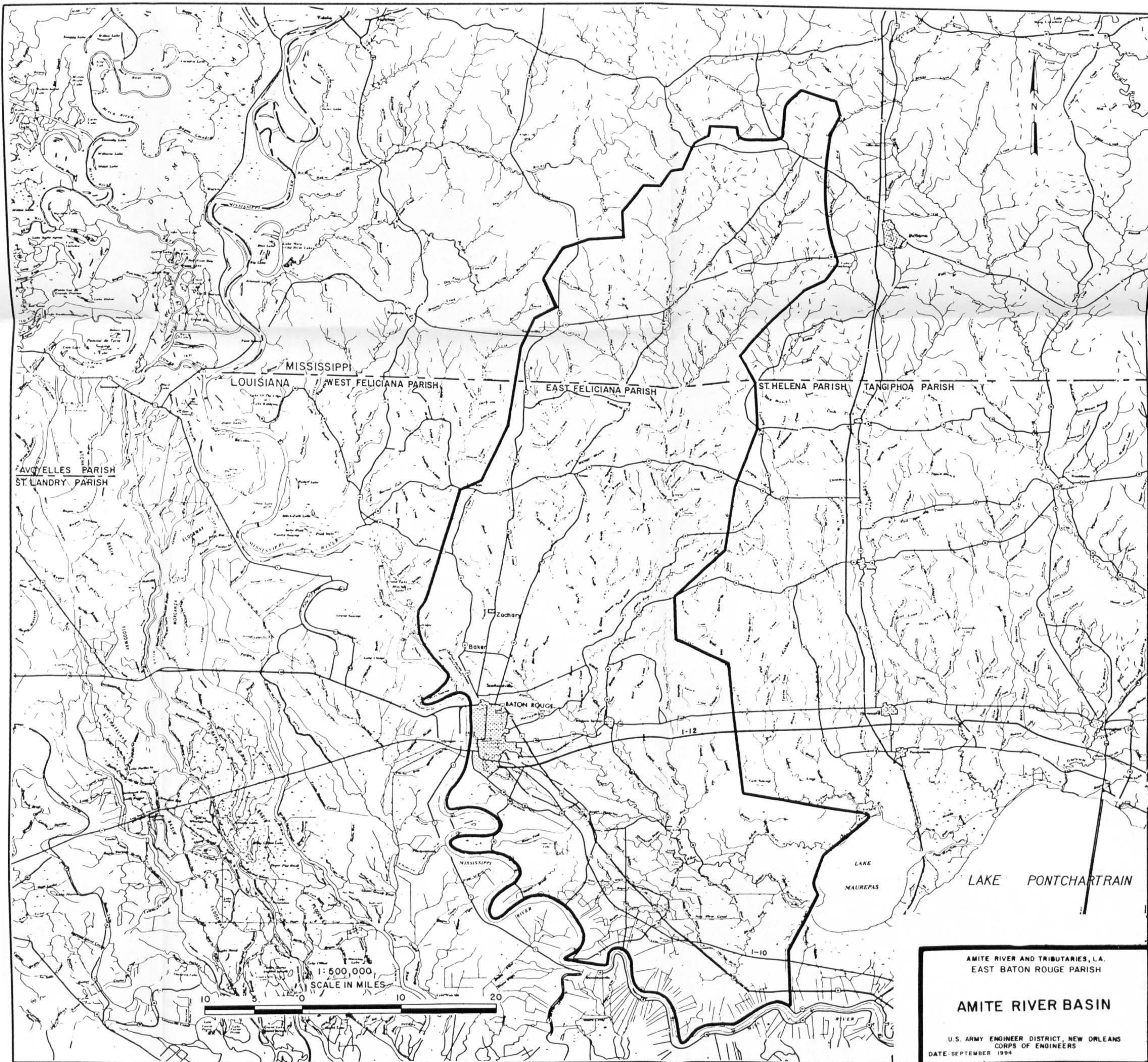
o. Assume complete responsibility for the clean up of any hazardous material located on project lands and regulated under Federal, state, and/or local laws or ordinances including the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and responsibility for operating, maintaining, replacing, repairing, and rehabilitating the project in a manner so that liability will not arise under CERCLA or other Federal, state, and/or local guidelines;

p. Comply with Section 601 of Title VI of the Civil Rights Act of 1964 (PL 88-352) that no person shall be excluded from participation in, denied the benefits of, or subjected to discrimination in connection with the project on the grounds of race, creed, or national origin;

q. Comply with Section 221 of PL 91-611, Flood Control Act of 1970, approved December 31, 1970, which provides that the construction of any water resource project by the Corps of Engineers shall not be started until the local sponsor has entered into a written agreement to furnish its required cooperation for the project;

r. Assure that construction and maintenance of any non-Federal flood control features do not diminish the flood protection provided by the authorized project plan.

The recommendations contained herein reflect the information available at this time and current departmental policies governing formulation of individual projects. They do not reflect program and budgeting priorities inherent in the formulation of a national civil works construction program nor the prospect of higher review levels within the Executive Branch. Consequently, the recommendations may be modified before they are transmitted to the Congress as proposed for authorization and implementation funding.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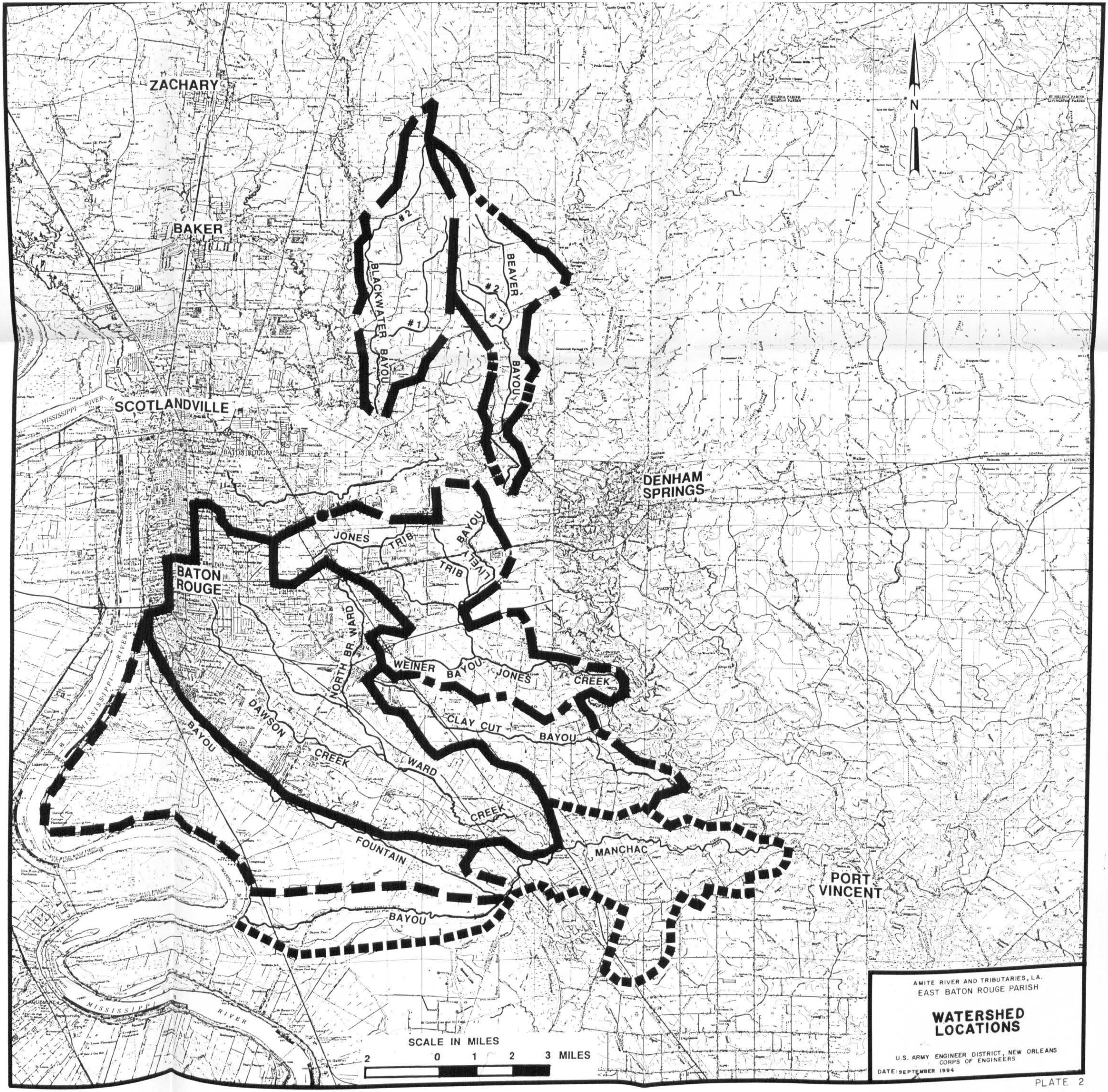
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
DATE: SEPTEMBER 1994

PLATE 1



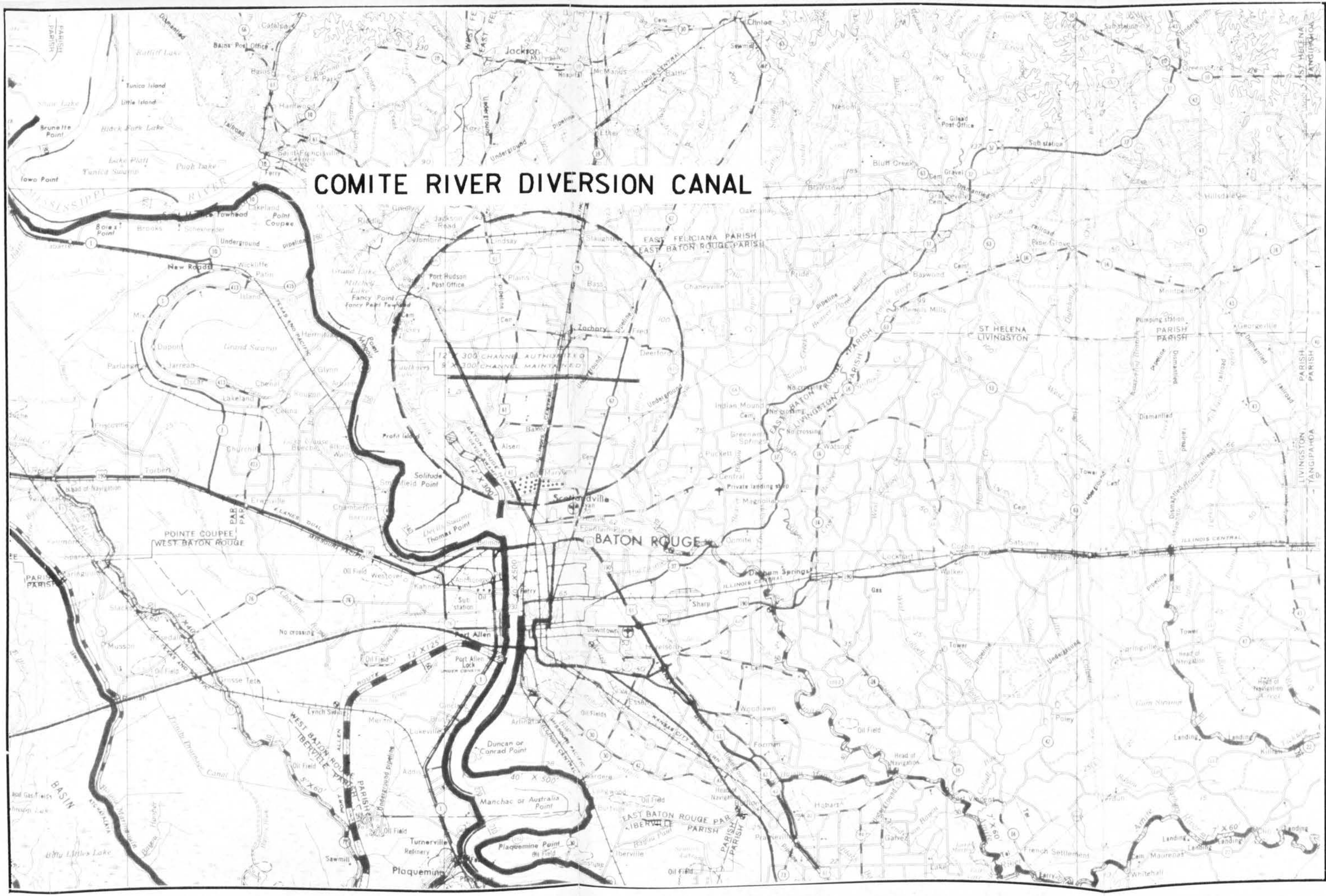
AMITE RIVER AND TRIBUTARIES, LA.
EAST BATON ROUGE PARISH

WATERSHED LOCATIONS

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

DATE: SEPTEMBER 1994

PLATE 2



AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PARISH FEASIBILITY STUDY

COMITE RIVER DIVERSION CANAL

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

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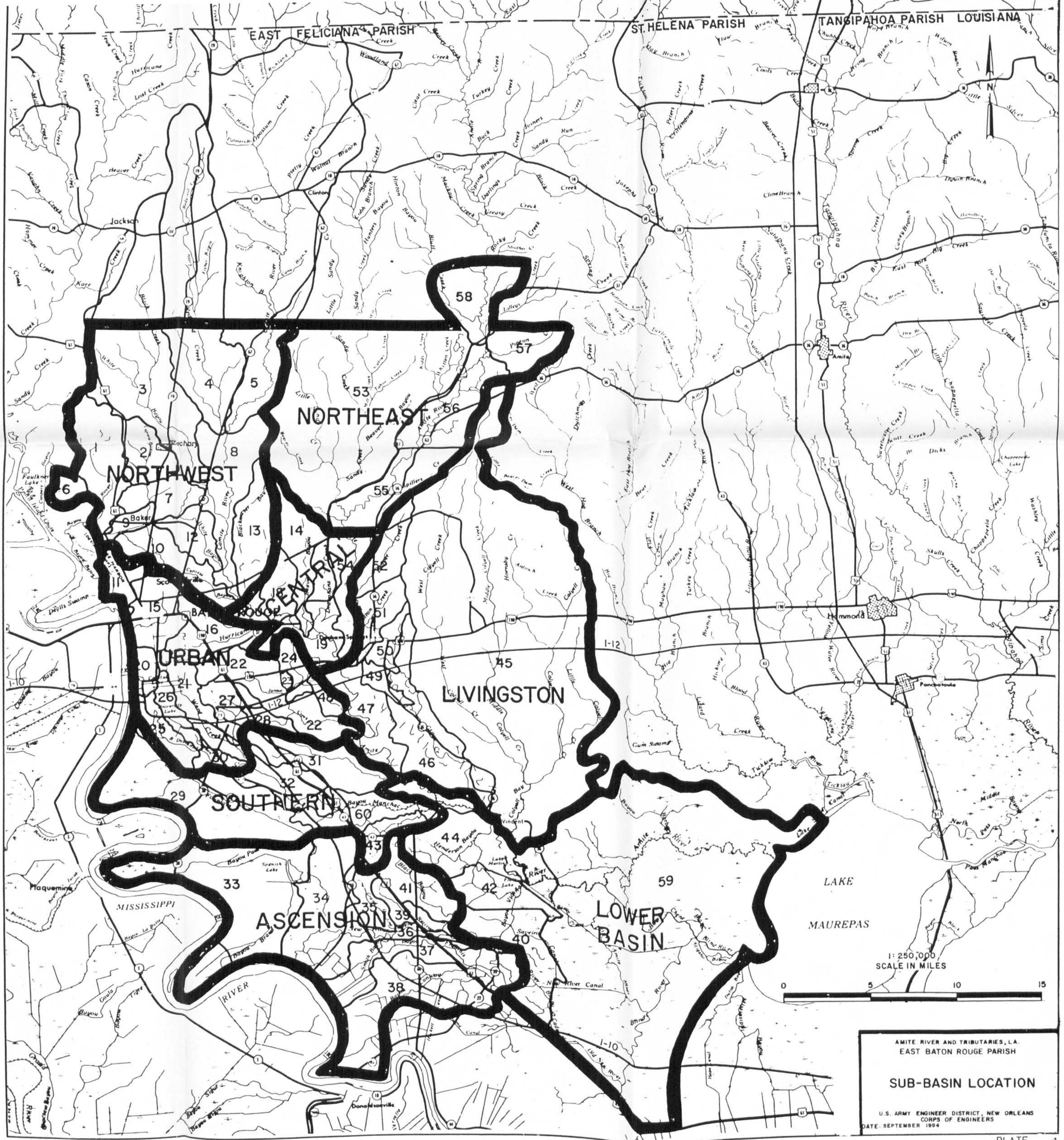
PLATE 3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SOUTHERN
ASCENSION
LOWER BASIN
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Jackson
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Hammond
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Baker
Zachary
Plaquemine
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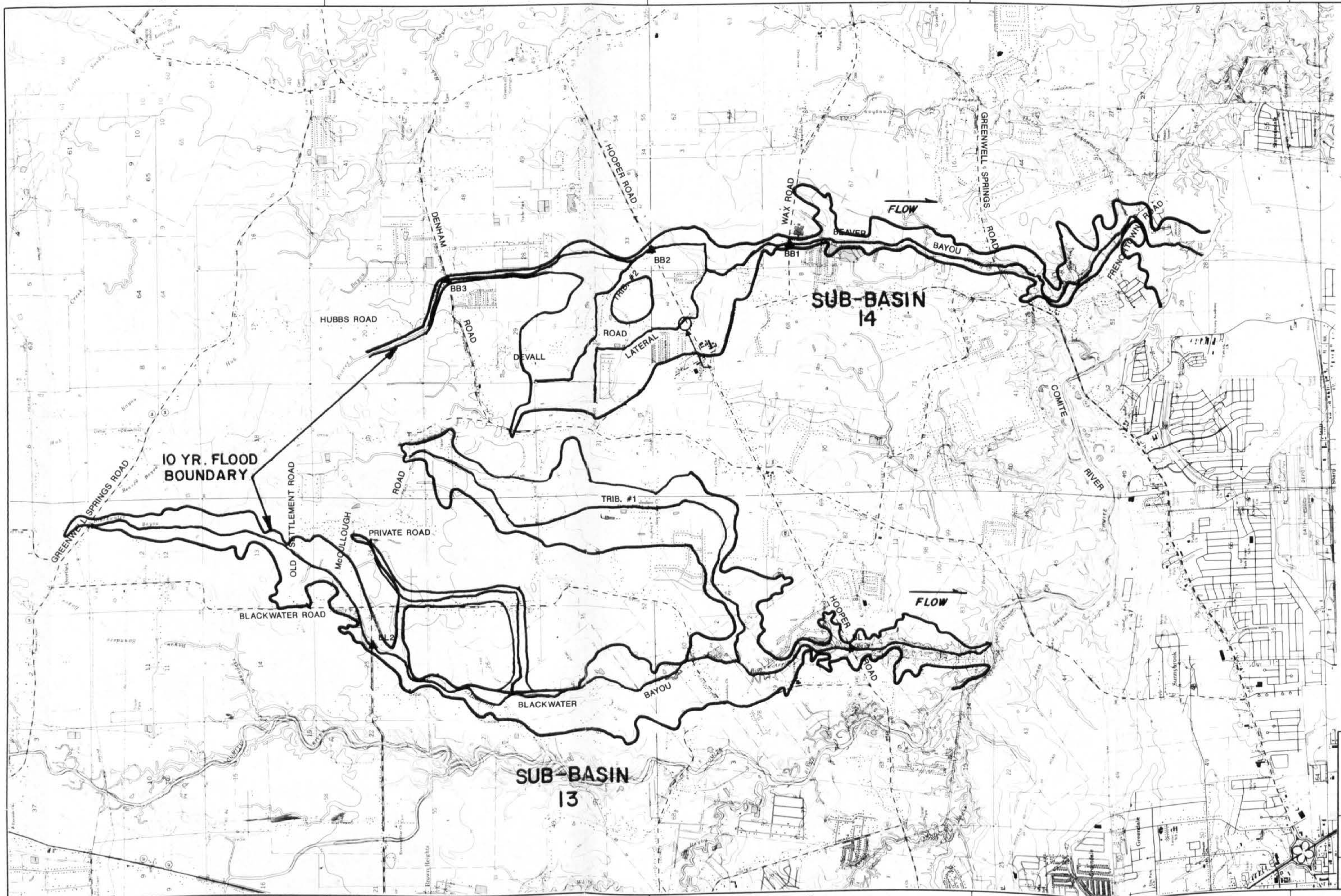
AMITE RIVER AND TRIBUTARIES, LA.
EAST BATON ROUGE PARISH
SUB-BASIN LOCATION
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
DATE: SEPTEMBER 1994



AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PARISH FEASIBILITY STUDY

BLACKWATER BAYOU, BEAVER BAYOU AND TRIBUTARIES

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

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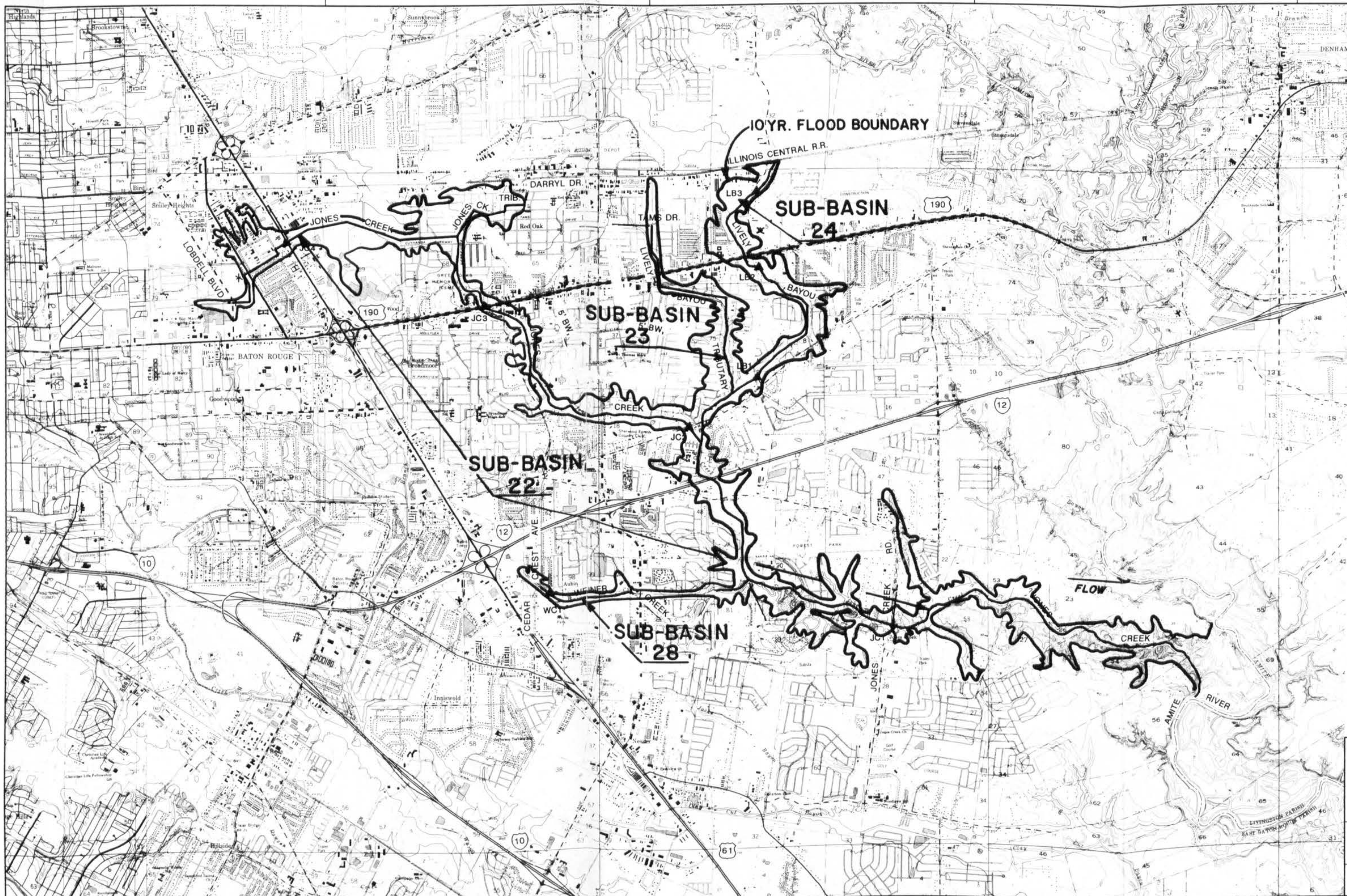

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AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PARISH FEASIBILITY STUDY

JONES CREEK
AND TRIBUTARIES

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

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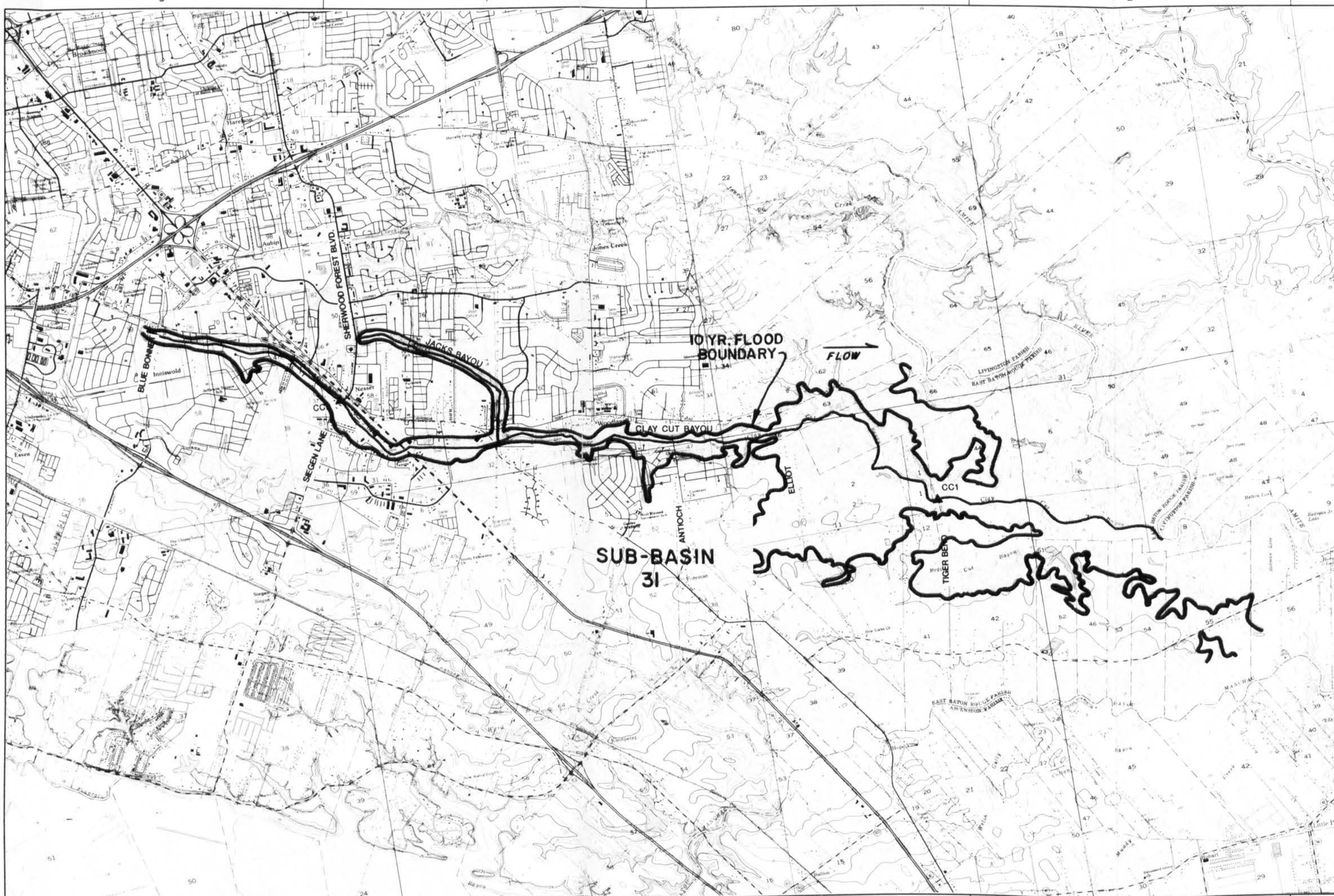
PLATE 6



AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PARISH FEASIBILITY STUDY

CLAY CUT BAYOU
AND TRIBUTARY

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

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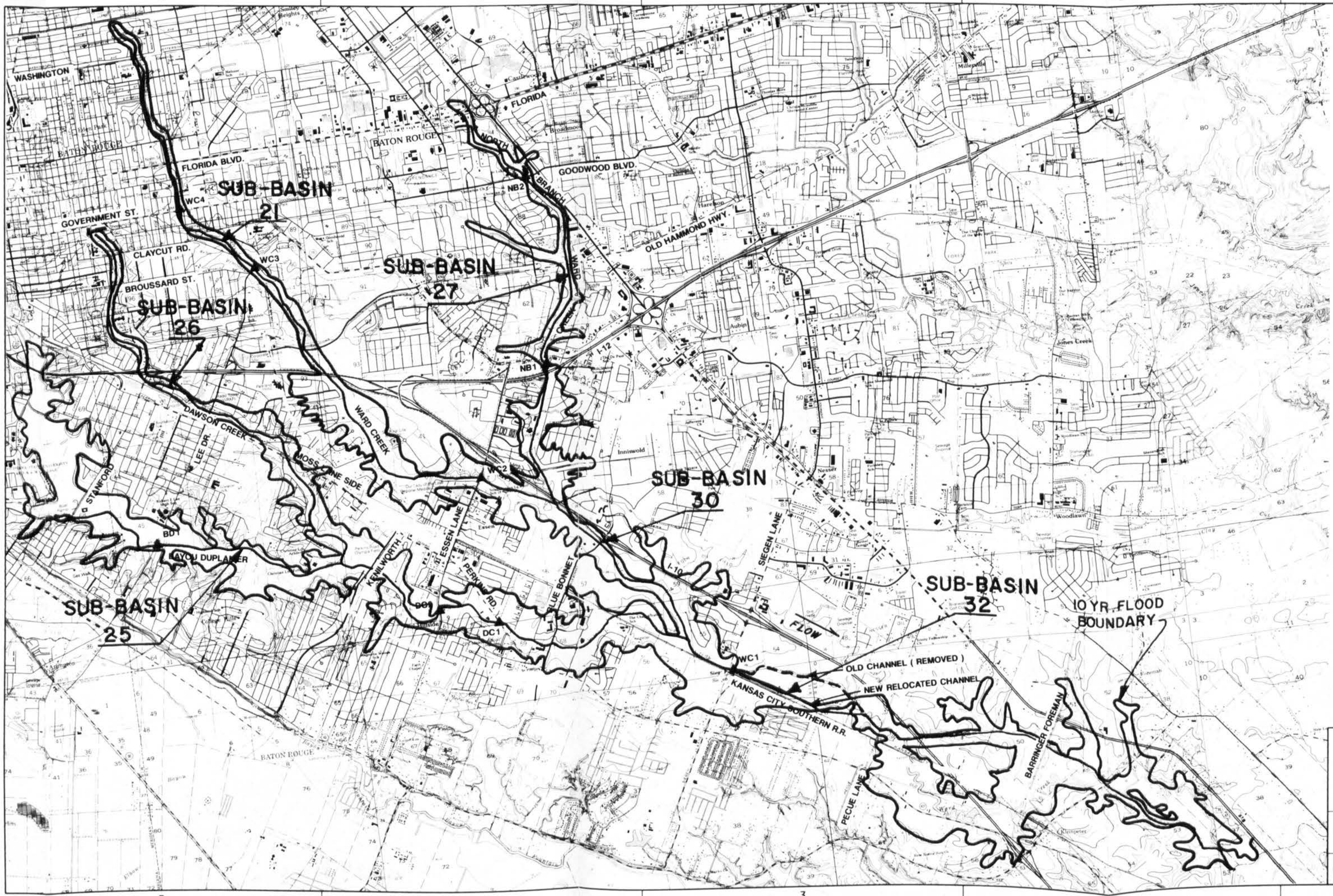
PLATE 7



AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PARISH FEASIBILITY STUDY

WARD CREEK
AND TRIBUTARIES

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: FV	PLOT SCALE: AS SHOWN	PLOT DATE: N/A	CADD FILE: N/A
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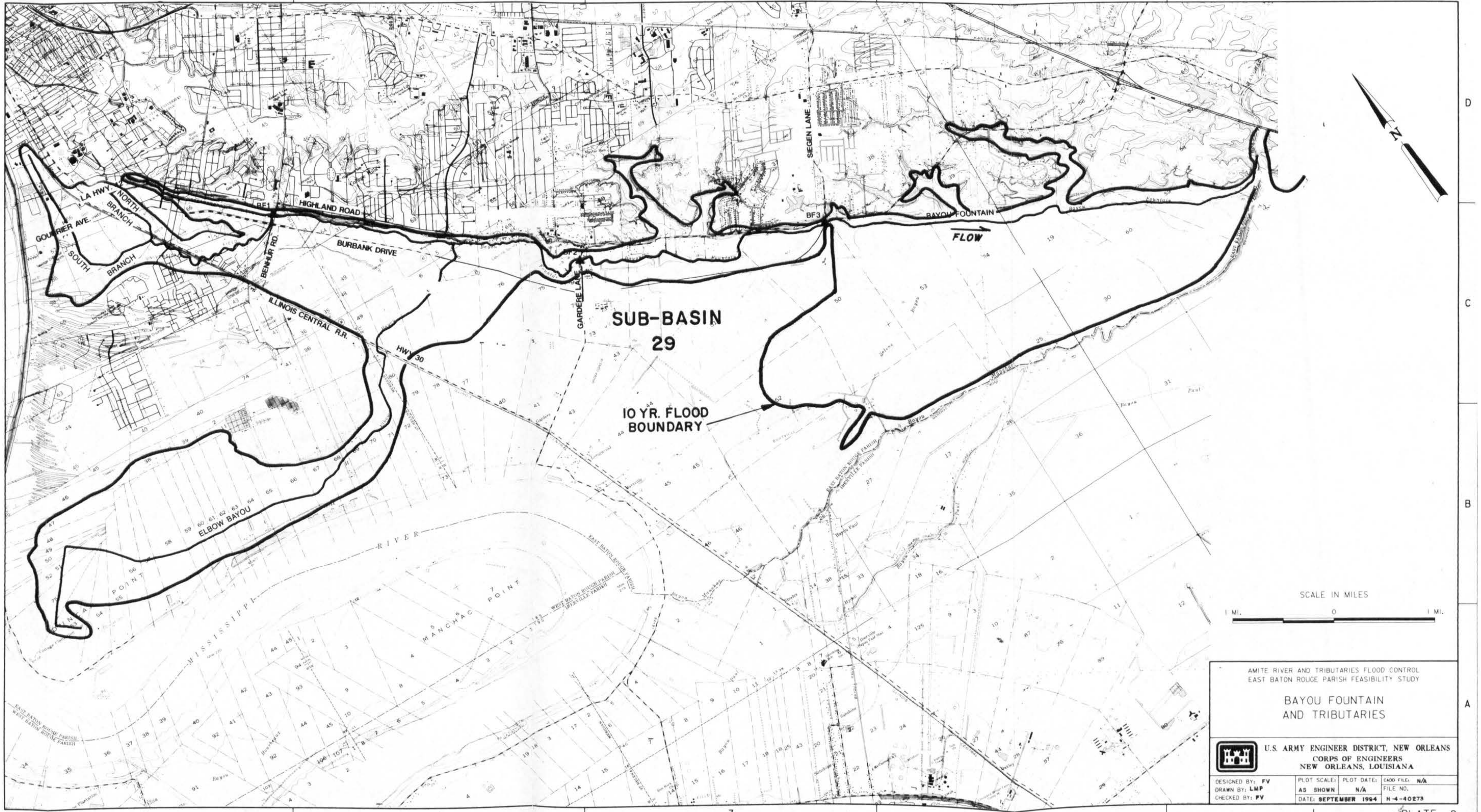
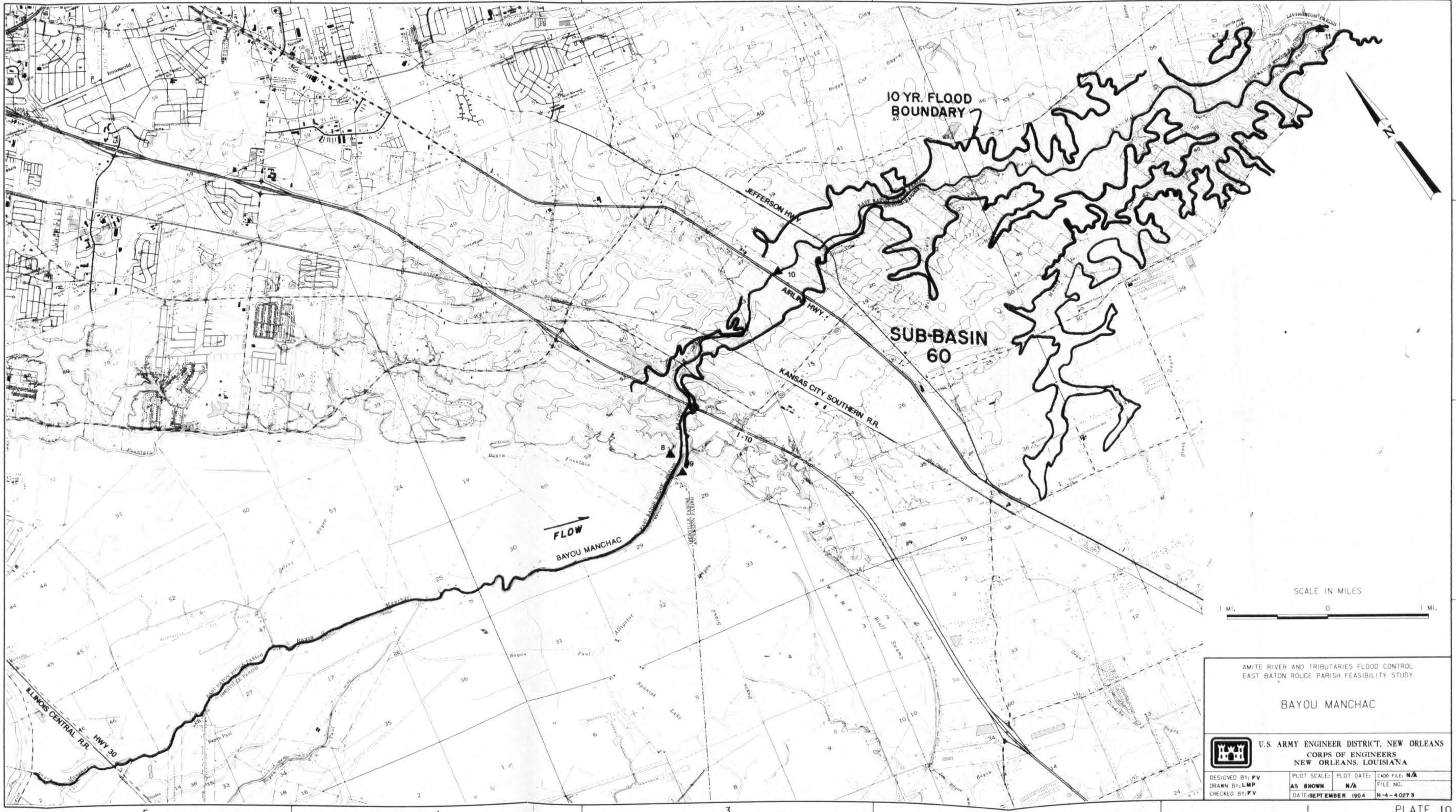
PLATE 8

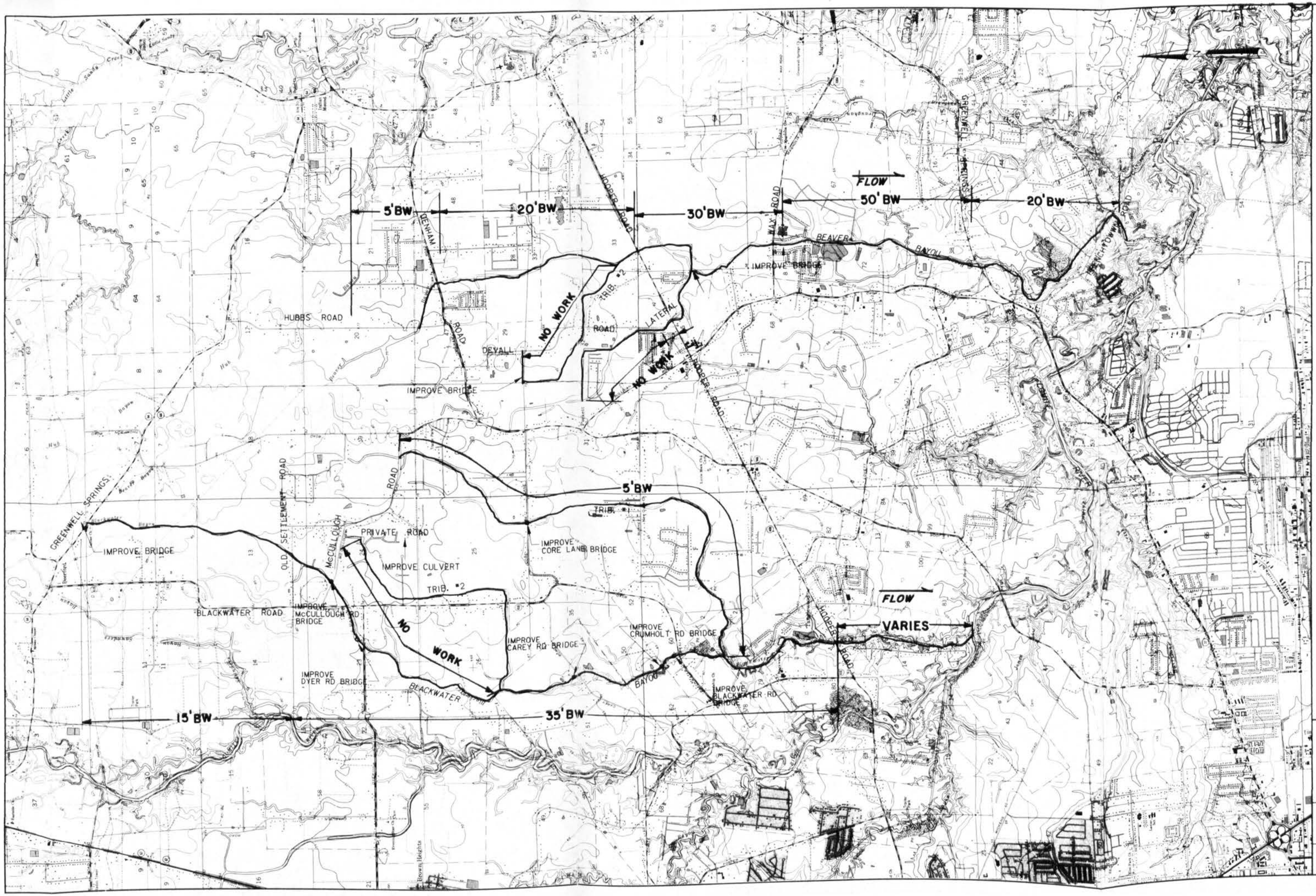


SUB-BASIN 29
10 YR. FLOOD BOUNDARY
HIGHLAND ROAD
BURBANK DRIVE
BENHUR RD.
GARDERE LANE
SIEGEN LANE
BAYOU FOUNTAIN
FLOW
BF1
BF2
BF3
LA HWY. 42
NORTH BRANCH
SOUTH BRANCH
GOURRIER AVE.
ILLINOIS CENTRAL R.R.
HWY 30
ELBOW BAYOU
MISSISSIPPI RIVER
POINT
MANCHAC POINT
EAST BATON ROUGE PARISH
WEST BATON ROUGE PARISH
IBERVILLE PARISH
SCALE IN MILES
1 MI. 0 1 MI.
AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PARISH FEASIBILITY STUDY
BAYOU FOUNTAIN
AND TRIBUTARIES
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA
DESIGNED BY: FV
DRAWN BY: LMP
CHECKED BY: FV
PLOT SCALE: AS SHOWN
PLOT DATE: N/A
CADD FILE: N/A
FILE NO. H-4-40273
DATE: SEPTEMBER 1994

PLATE 9



10 YR. FLOOD BOUNDARY
SUB-BASIN 60
JEFFERSON HWY.
AIRLINE HWY.
KANSAS CITY SOUTHERN R.R.
I-10
FLOW
BAYOU MANCHAC
ILLINOIS CENTRAL R.R.
HWY 30
LIVINGSTON PARISH
EAST BATON ROUGE PARISH
IBERVILLE PARISH
ASCENSION PARISH
Bayou Fountain
Alligator Bayou
Spanish Lake
Bayou Paul
Inniswold
Woodlawn
Prairieville
SCALE IN MILES
1 MI. 0 1 MI.
AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PARISH FEASIBILITY STUDY
BAYOU MANCHAC
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA
DESIGNED BY: FV
DRAWN BY: LMP
CHECKED BY: FV
PLOT SCALE: AS SHOWN
PLOT DATE: N/A
CADD FILE: N/A
FILE NO. H-4-40273
DATE: SEPTEMBER 1994
PLATE 10



BEAVER BAYOU
10-YEAR EARTHEN CHANNEL PLANS
BBN-P1(MAIN CHANNEL AND TRIBUTRIES)
BBN-P1 (MAIN CHANNEL ONLY)

BLACKWATER BAYOU
10-YEAR EARTHEN CHANNEL PLANS
BW-P1 (MAIN CHANNEL ONLY)
BW-P2 (MAIN CHANNEL AND TRIBUTARY 1)

BW = PROPOSED BOTTOM WIDTH
DESIGN SIDE SLOPES 1.0V on 3.5H

SCALE IN MILES

1 MI. 0 1 MI.

AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PARISH FEASIBILITY STUDY

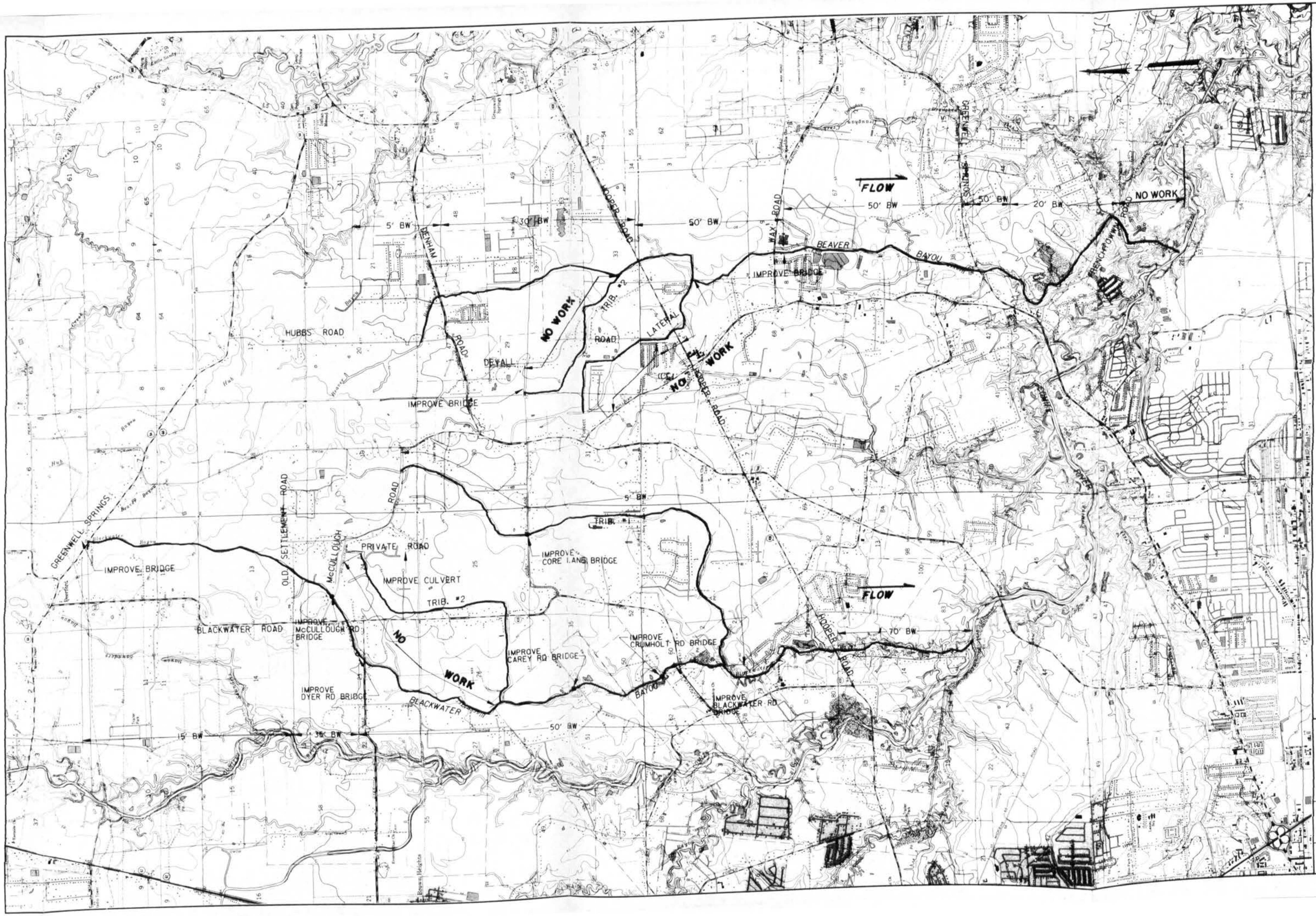
BLACKWATER, BEAVER BAYOUS AND TRIBUTARIES

PLANS: BW-P1, BW-P2; BBN-P1.

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: PV	PLOT SCALE: AS SHOWN	PLOT DATE: N/A	CADD FILE: N/A
DRAWN BY: LMP			FILE NO.
CHECKED BY: PV	DATE: SEPTEMBER 1994		H-4-40275

PLATE 11



BEAVER BAYOU
25-YEAR EARTHEN CHANNEL PLANS
BBN-P7 (MAIN CHANNEL AND TRIBUTRIES)
BBN-P2 (MAIN CHANNEL ONLY)

BLACKWATER BAYOU
25-YEAR EARTHEN CHANNEL PLANS
BW-P3 (MAIN CHANNEL ONLY)
BW-P4 (MAIN CHANNEL AND TRIBUTARY 1)

BW = PROPOSED BOTTOM WIDTH
DESIGN SIDE SLOPES 1.0V on 3.5H

SCALE IN MILES

1MI. 0 1MI.

AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PARISH FEASIBILITY STUDY

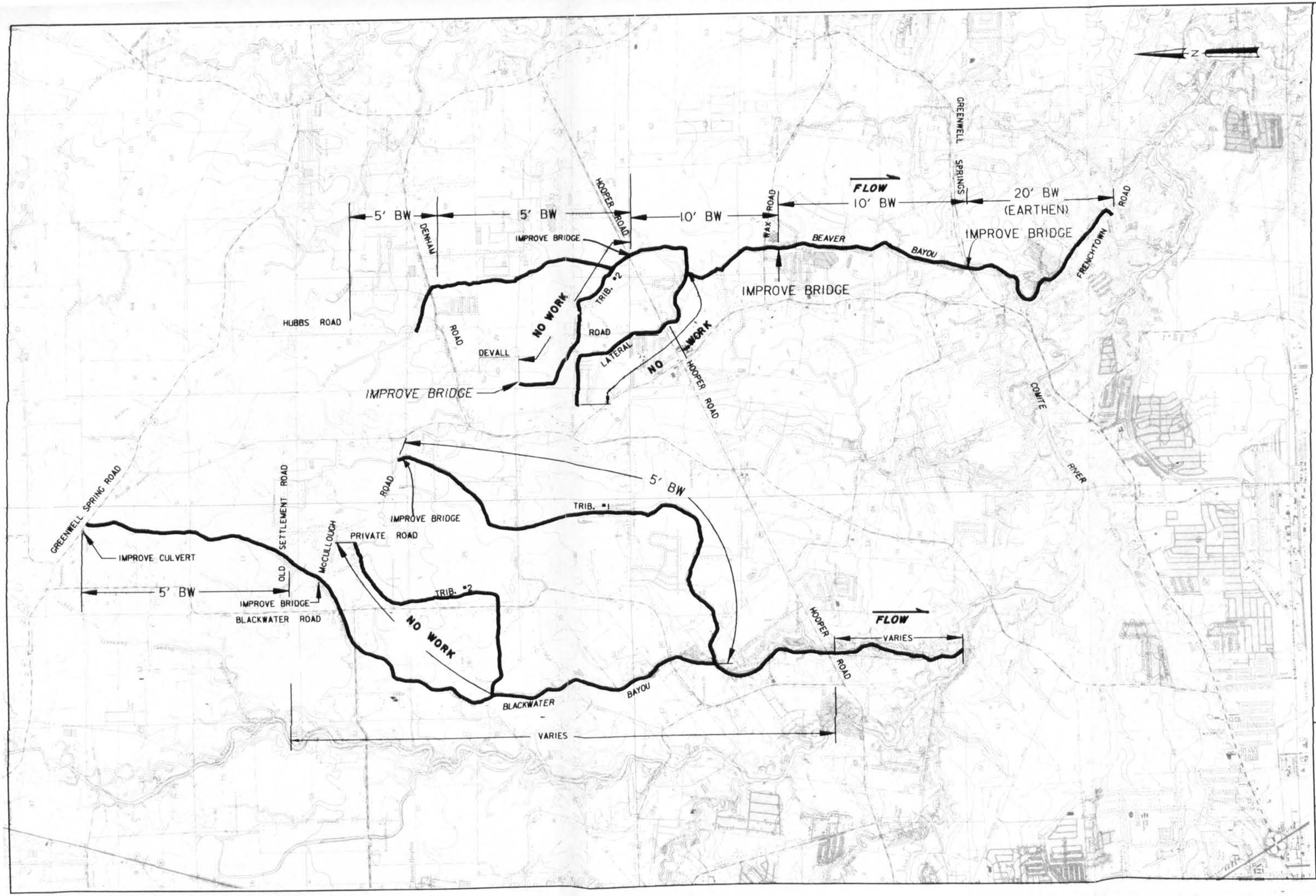
BLACKWATER, BEAVER BAYOUS AND TRIBUTARIES

PLANS: BW-P3, BW-P4; BBN-P2,

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: FV	PLOT SCALE: AS SHOWN	PLOT DATE: N/A	CADD FILE: N/A
DRAWN BY: LMP			FILE NO.
CHECKED BY: FV	DATE: SEPTEMBER 1994		H-4-40273

PLATE 12



BEAVER BAYOU
MINIMUM CONCRETE LINED CHANNEL PLANS

BBN-P4 (MAIN CHANNEL ONLY)

BLACKWATER BAYOU
10-YEAR CONCRETE LINED CHANNEL PLANS
BW-P5 (MAIN CHANNEL ONLY)
BW-P6 (MAIN CHANNEL AND TRIBUTARY 1)

BW = PROPOSED CONCRETE BOTTOM WIDTH
DESIGN CONCRETE LINED SIDE SLOPES
1.0V on 3.0H

SCALE IN MILES
1MI. 0 1MI.

AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PARISH FEASIBILITY STUDY

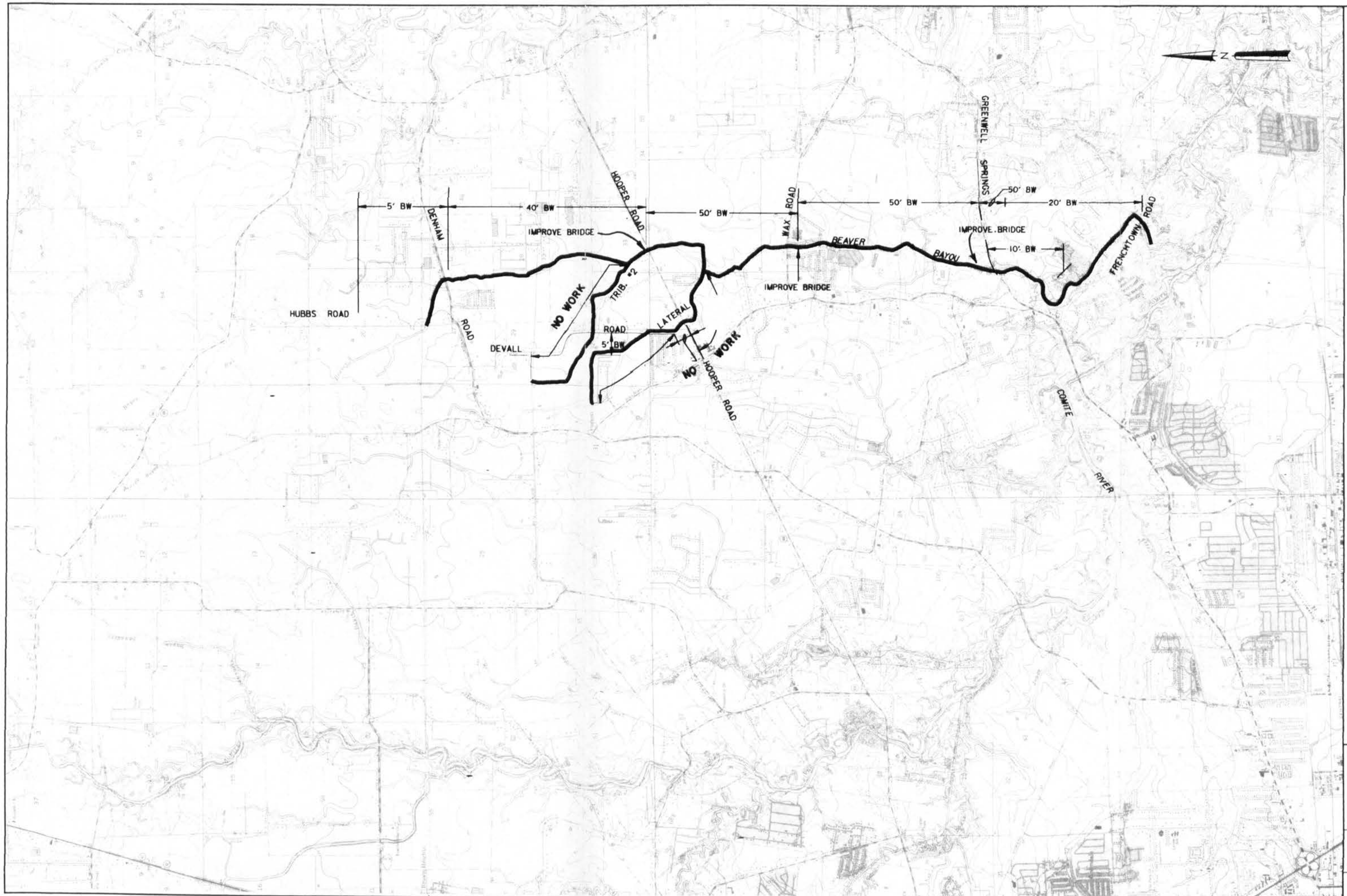
BLACKWATER, BEAVER BAYOUS AND TRIBUTARIES

PLANS: BW-P5, BW-P6; BBN-P4

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: FV	PLOT SCALE: AS SHOWN	PLOT DATE: N/A	CADD FILE: N/A
DRAWN BY: LMP			FILE NO.
CHECKED BY: FV	DATE: SEPTEMBER 1994		H-4-40273

PLATE 13



BEAVER BAYOU
50-YEAR EARTHEN CHANNEL PLANS
BBN-P3 (MAIN CHANNEL ONLY)
BBN-P6 (MAIN CHANNEL ONLY)

SCALE IN MILES

1 MI. 0 1 MI.

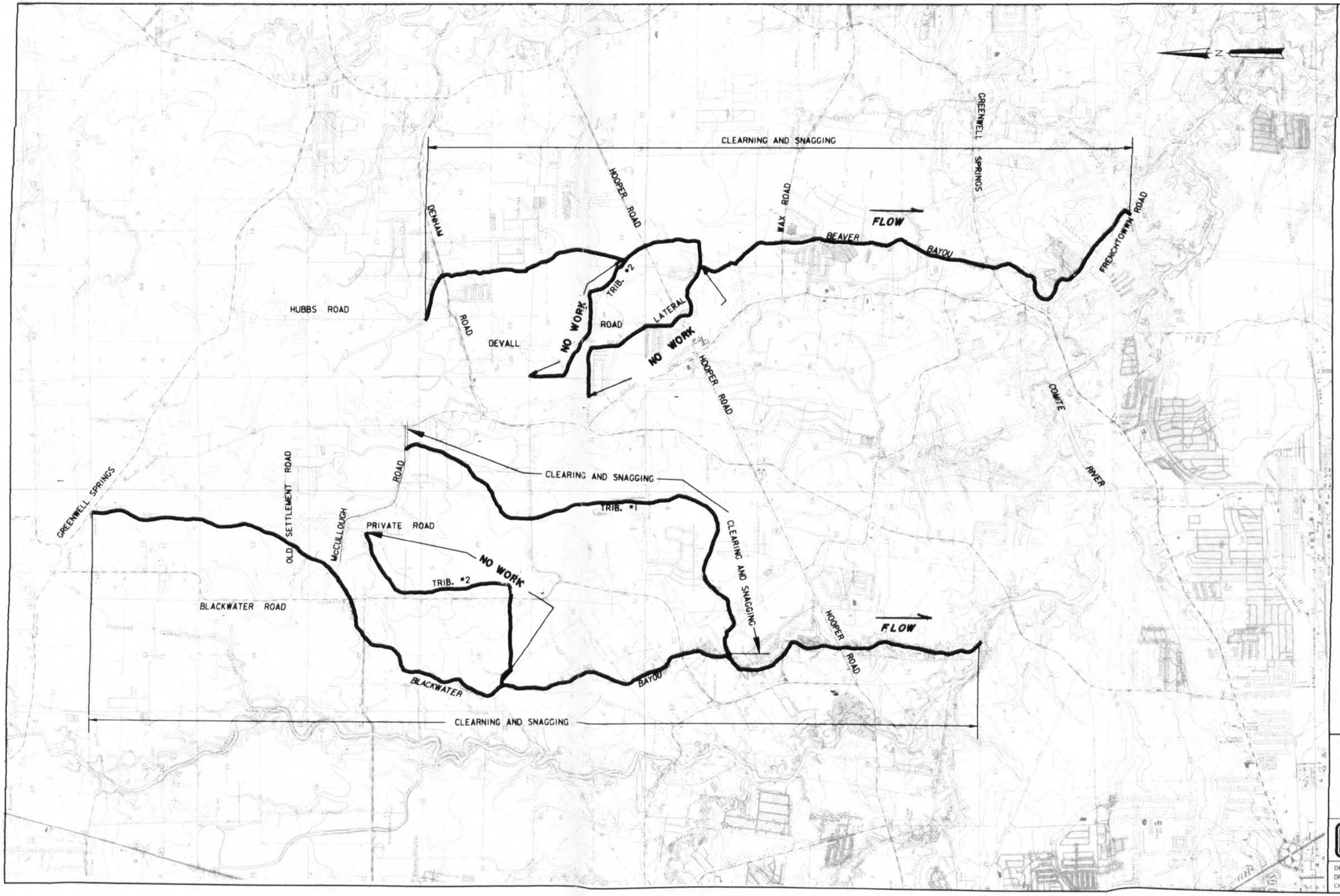
AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PARISH FEASIBILITY STUDY

BEAVER BAYOU AND TRIBUTARIES

PLANS: BBN-P3,

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: FV	PLOT SCALE:	PLOT DATE:	CADD FILE: N/A
DRAWN BY: LMP	AS SHOWN	N/A	FILE NO.
CHECKED BY: FV	DATE: SEPTEMBER 1994		H-4-40273



SCALE IN MILES

1MI. 0 1MI.

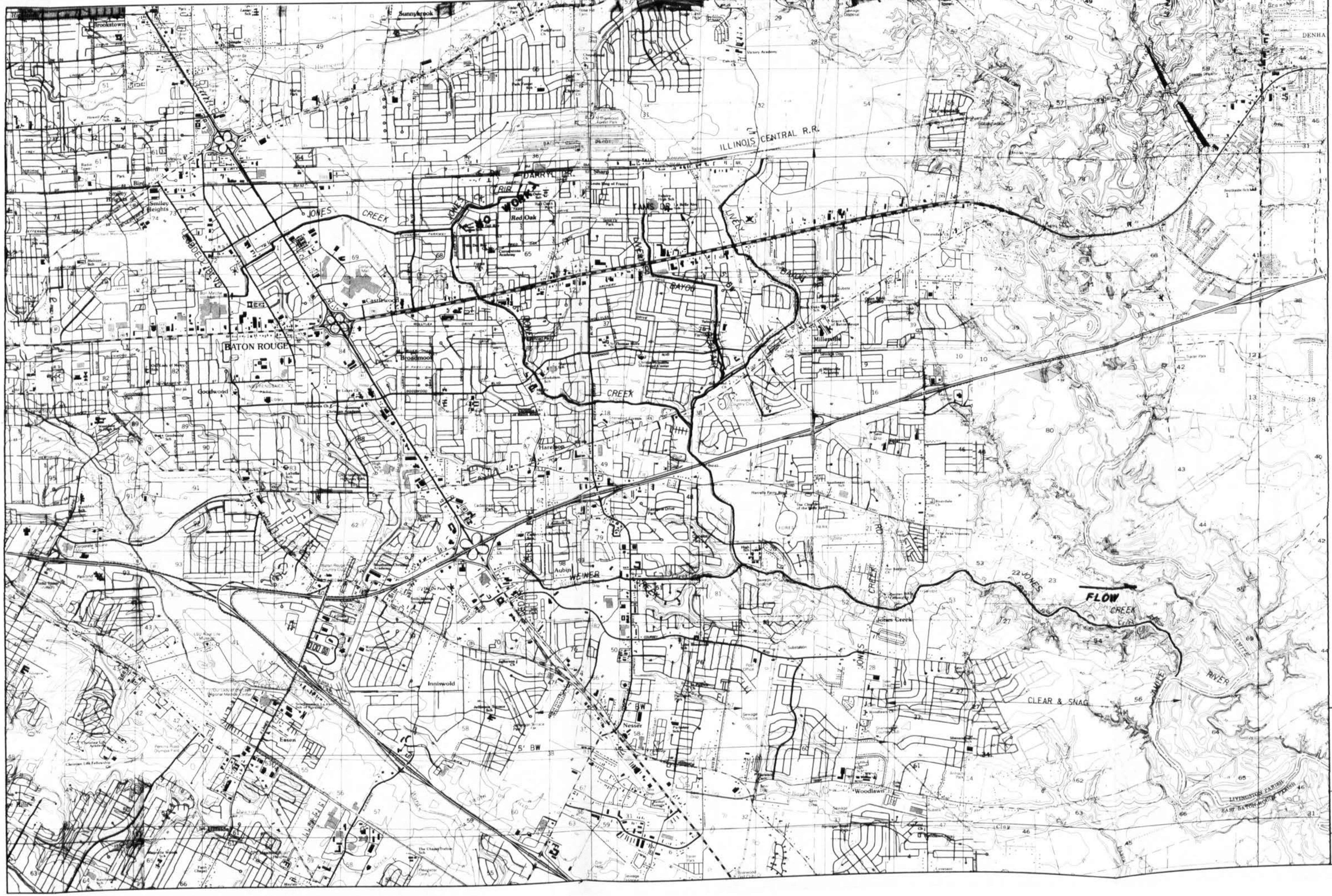
AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PARISH FEASIBILITY STUDY

BLACKWATER, BEAVER BAYOUS AND TRIBUTARIES

PLANS: BW-P7, BBC-P9;

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: FV DRAWN BY: LMP CHECKED BY: FV	PLOT SCALE: AS SHOWN	PLOT DATE: N/A	CADD FILE: N/A
	DATE: SEPTEMBER 1994		FILE NO. H-4-40273



PLANS JCCL-PI (MAIN CHANNEL AND TRIBUTARIES)

PLANS JCCL-P3 (MAIN CHANNEL ONLY)

BW = PROPOSED CONCRETE BOTTOM WIDTH
CONCRETE LINED SIDE SLOPES - 1.0V on 3.0H

SCALE IN MILES

1 MI. 0 1 MI.

AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PAISH FEASIBILITY STUDY

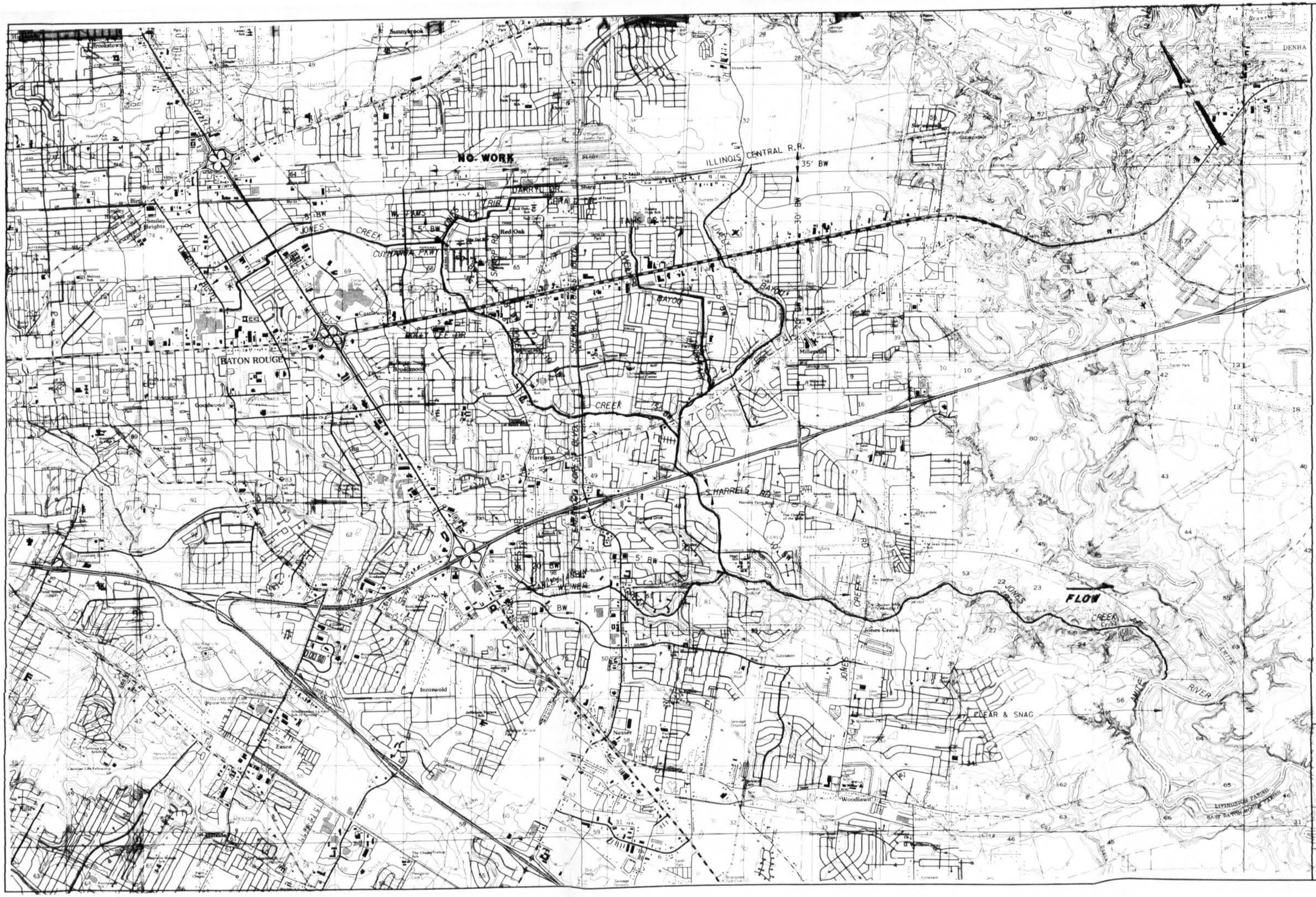
JONES CREEK AND TRIBUTARIES

PLANS JCCL-PI AND JCCL-P3

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: FV	PLOT SCALE:	PLOT DATE:	CADD FILE: N/A
DRAWN BY: LMP	AS SHOWN	N/A	FILE NO.
CHECKED BY: FV	DATE: SEPTEMBER 1994		H-4-40273

PLATE 16



PLANS JCCL-P2 (MAIN CHANNEL AND TRIBUTARIES)

PLANS JCCL-P4 (MAIN CHANNEL ONLY)

BW = PROPOSED CONCRETE BOTTOM WIDTH
CONCRETE LINED SIDE SLOPES - 1.0V on 3.0H

SCALE IN MILES

1 MI. 0 1 MI.

AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PAISH FEASIBILITY STUDY

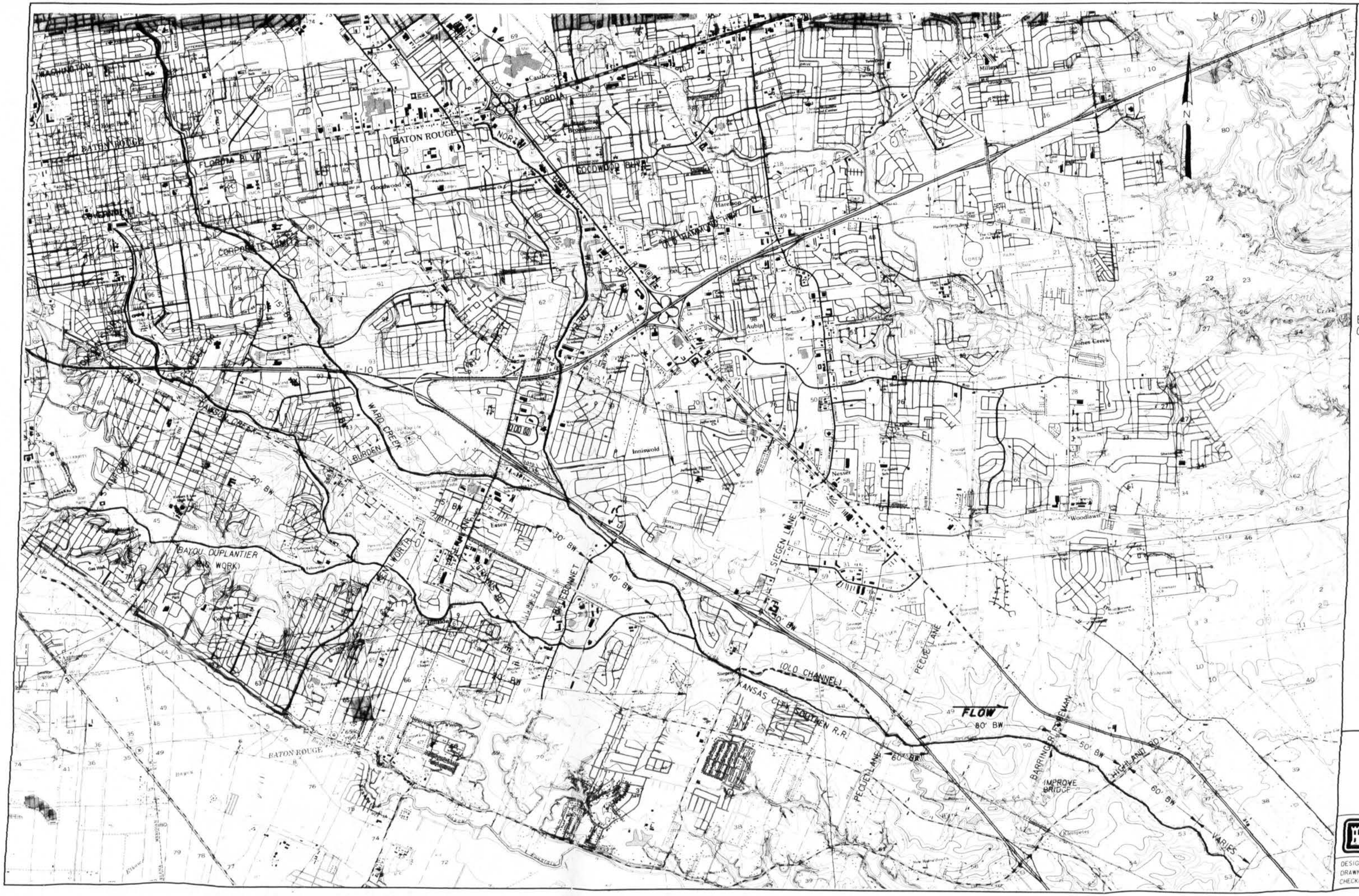
JONES CREEK AND TRIBUTARIES

PLANS JCCL-P2 AND JCCL-P4

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: FV	PLOT SCALE: AS SHOWN	PLOT DATE: N/A	CADD FILE: N/A
DRAWN BY: LMP			FILE NO. H-4-40273
CHECKED BY: FV	DATE: SEPTEMBER 1994		

PLATE 17



PLAN WCC-PI (25-YEAR CONCRETE LINED CHANNEL; MAIN CHANNEL ONLY)

PLAN WCC-P4 (25-YEAR CONCRETE LINED CHANNEL; MAIN CHANNEL AND TRIBUTARIES)

BW = PROPOSED CONCRETE BOTTOM WIDTHS
CONCRETE LINED SIDE SLOPES - 1.0V on 3.0H

SCALE IN MILES

1 MI. 0 1 MI.

AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PARISH FEASIBILITY STUDY

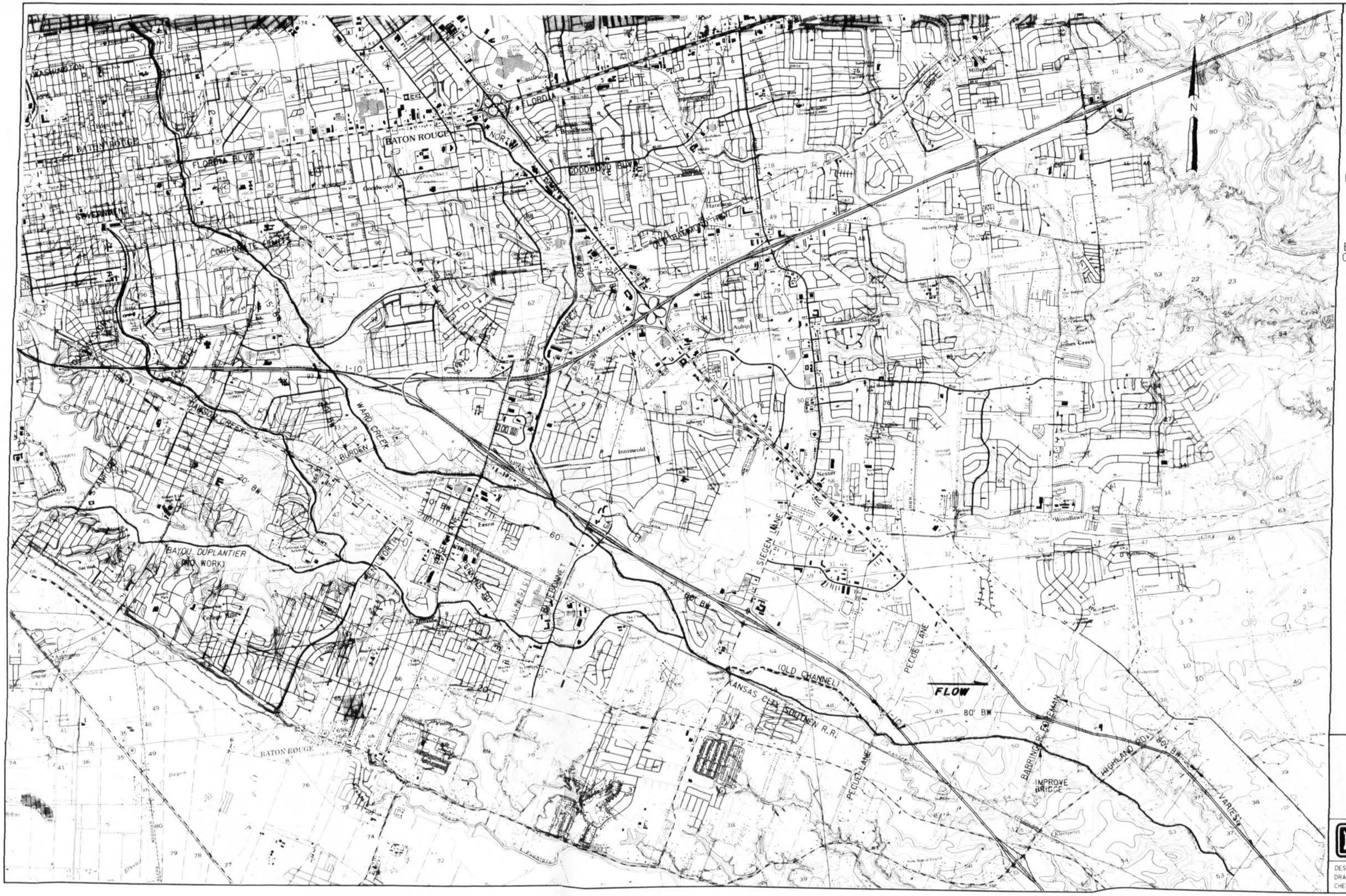
WARD CREEK AND TRIBUTARIES

PLANS WCC-PI and WCC-P4

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: FV	PLOT SCALE: AS SHOWN	PLOT DATE: N/A	CADD FILE: N/A
DRAWN BY: LMP	DATE: SEPTEMBER 1994		FILE NO. H-4-40273
CHECKED BY: FV			

PLATE 18



PLAN WCC-P2 (50-YEAR CONCRETE LINED CHANNEL; MAIN CHANNEL ONLY)

PLAN WCC-P5 (50-YEAR CONCRETE LINED CHANNEL; MAIN CHANNEL AND TRIBUTARIES)

BW = PROPOSED CONCRETE BOTTOM WIDTHS
CONCRETE LINED SIDE SLOPES - 1.0V on 3.0H

SCALE IN MILES

1MI. 0 1MI.

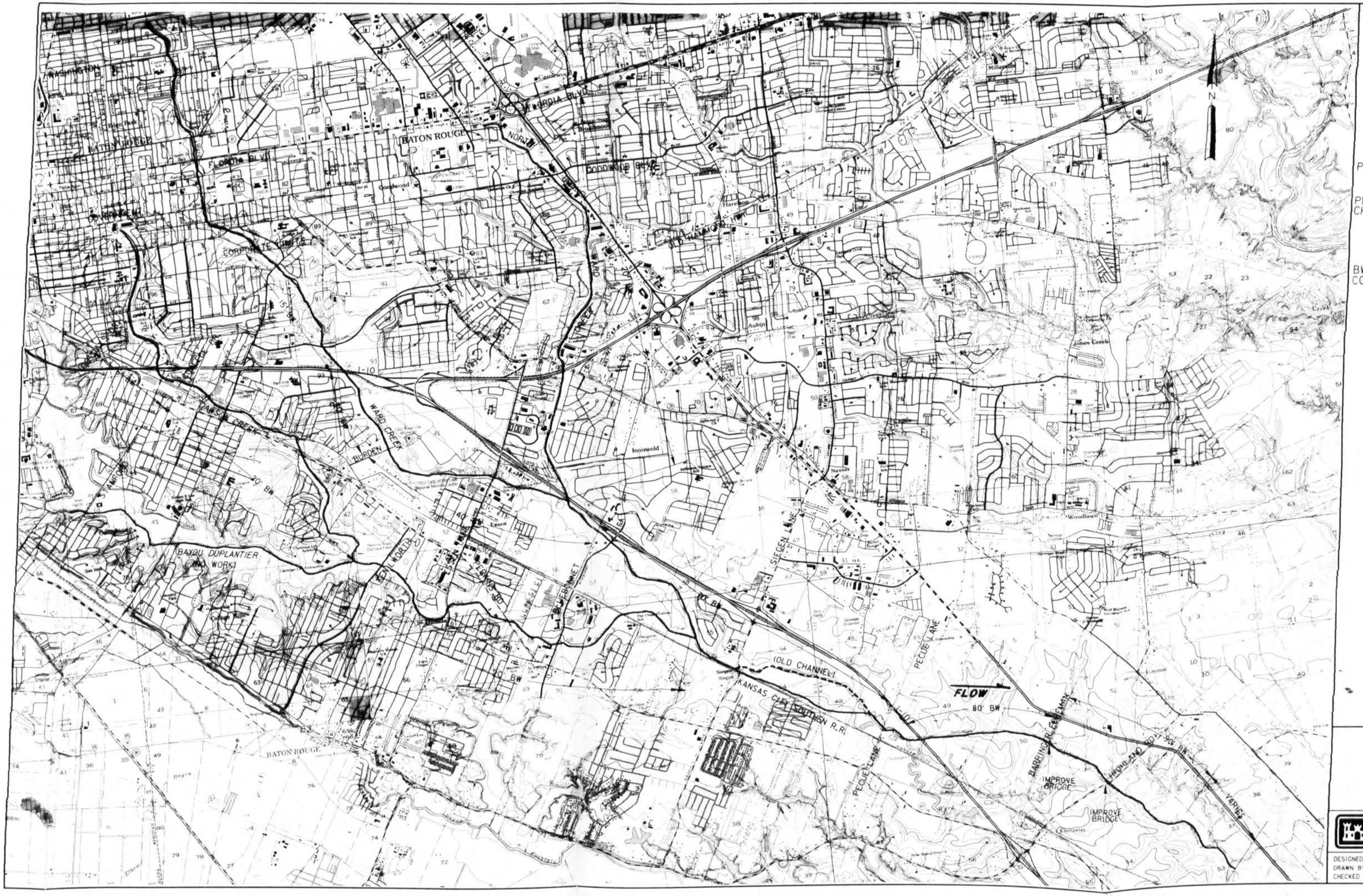
AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PARISH FEASIBILITY STUDY

WARD CREEK AND TRIBUTARIES

PLANS WCC-P2 and WCC-P5

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: FV	PLOT SCALE: AS SHOWN	PLOT DATE: N/A	CADD FILE: N/A
DRAWN BY: LMP			FILE NO.
CHECKED BY: FV	DATE: SEPTEMBER 1994		H-4-40273



PLAN WCC-P3 (100-YEAR CONCRETE LINED CHANNEL; MAIN CHANNEL ONLY)

PLAN WCC-P6 (100-YEAR CONCRETE LINED CHANNEL; MAIN CHANNEL AND TRIBUTARIES)

BW = PROPOSED CONCRETE BOTTOM WIDTHS
CONCRETE LINED SIDE SLOPES - 1.0V on 3.0H

SCALE IN MILES

1 MI. 0 1 MI.

AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PARISH FEASIBILITY STUDY

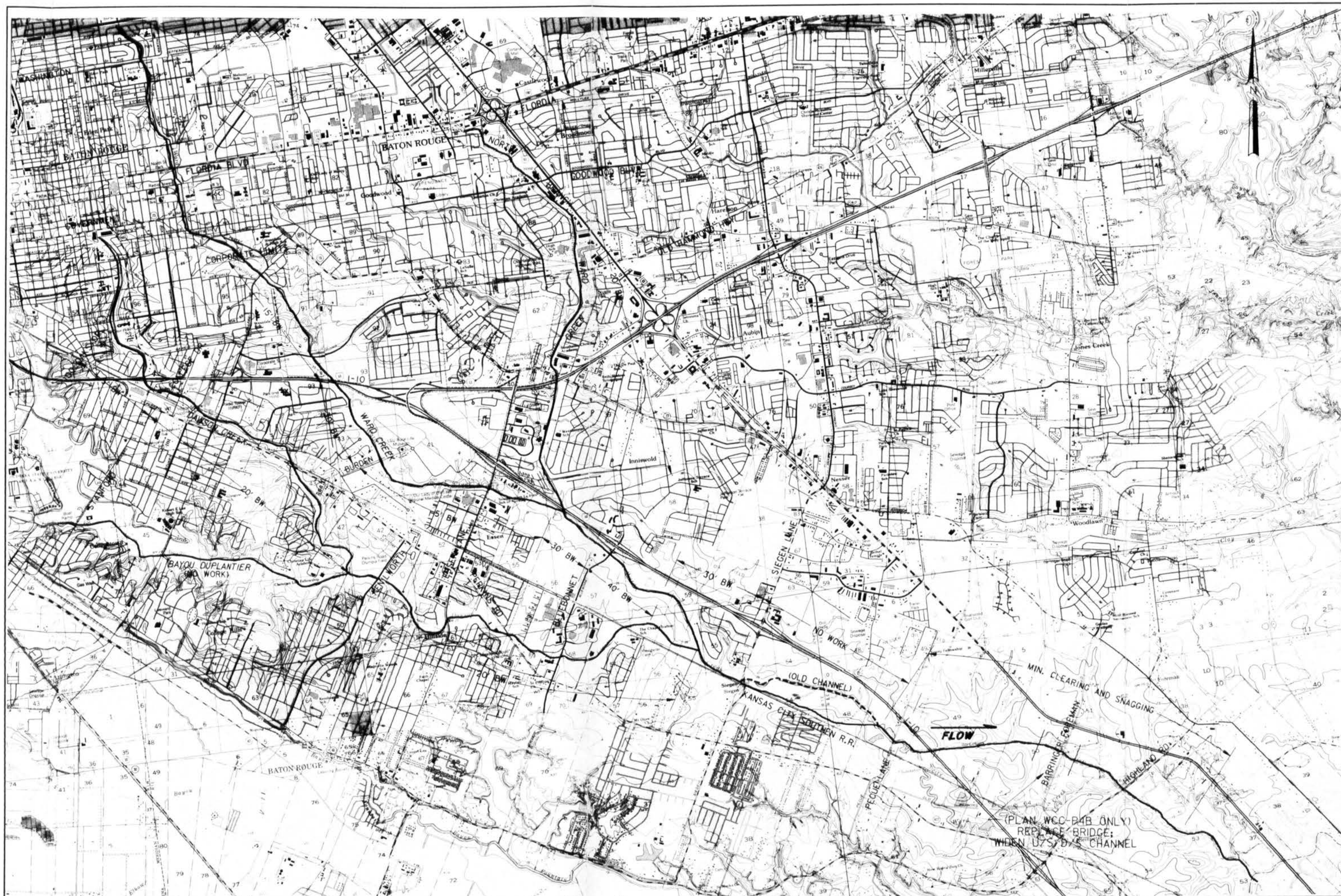
WARD CREEK AND TRIBUTARIES

PLANS WCGP3 and WCC-P6

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: FV	PLOT SCALE: AS SHOWN	PLOT DATE: N/A	CADD FILE: N/A
DRAWN BY: LMP			FILE NO.
CHECKED BY: FV	DATE: SEPTEMBER 1994		H-4-40273

PLATE 20



BW = PROPOSED CONCRETE BOTTOM WIDTHS
CONCRETE LINED SIDE SLOPES - 1.0V on 3.0H

SCALE IN MILES

1MI. 0 1MI.

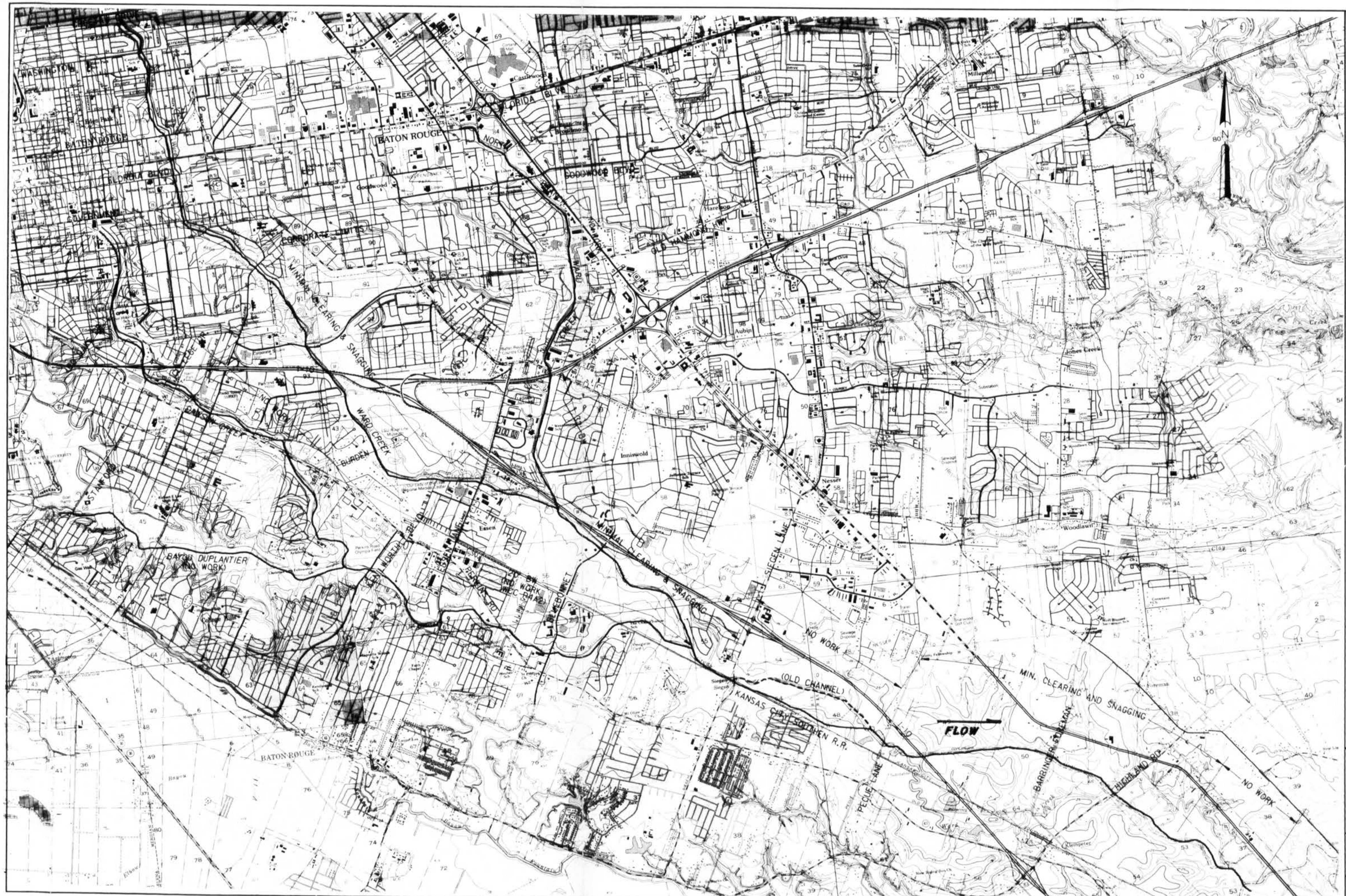
AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PARISH FEASIBILITY STUDY

WARD CREEK AND TRIBUTARIES

PLANS WCC-P4A and WCC-P4B

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: FV	PLOT SCALE: AS SHOWN	PLOT DATE: N/A	CADD FILE: N/A
DRAWN BY: LMP			FILE NO.
CHECKED BY: FV	DATE: SEPTEMBER 1994		H-4-40273



BW = PROPOSED CONCRETE BOTTOM WIDTHS
CONCRETE LINED SIDE SLOPES - 1.0V on 3.0H

SCALE IN MILES

1 MI. 0 1 MI.

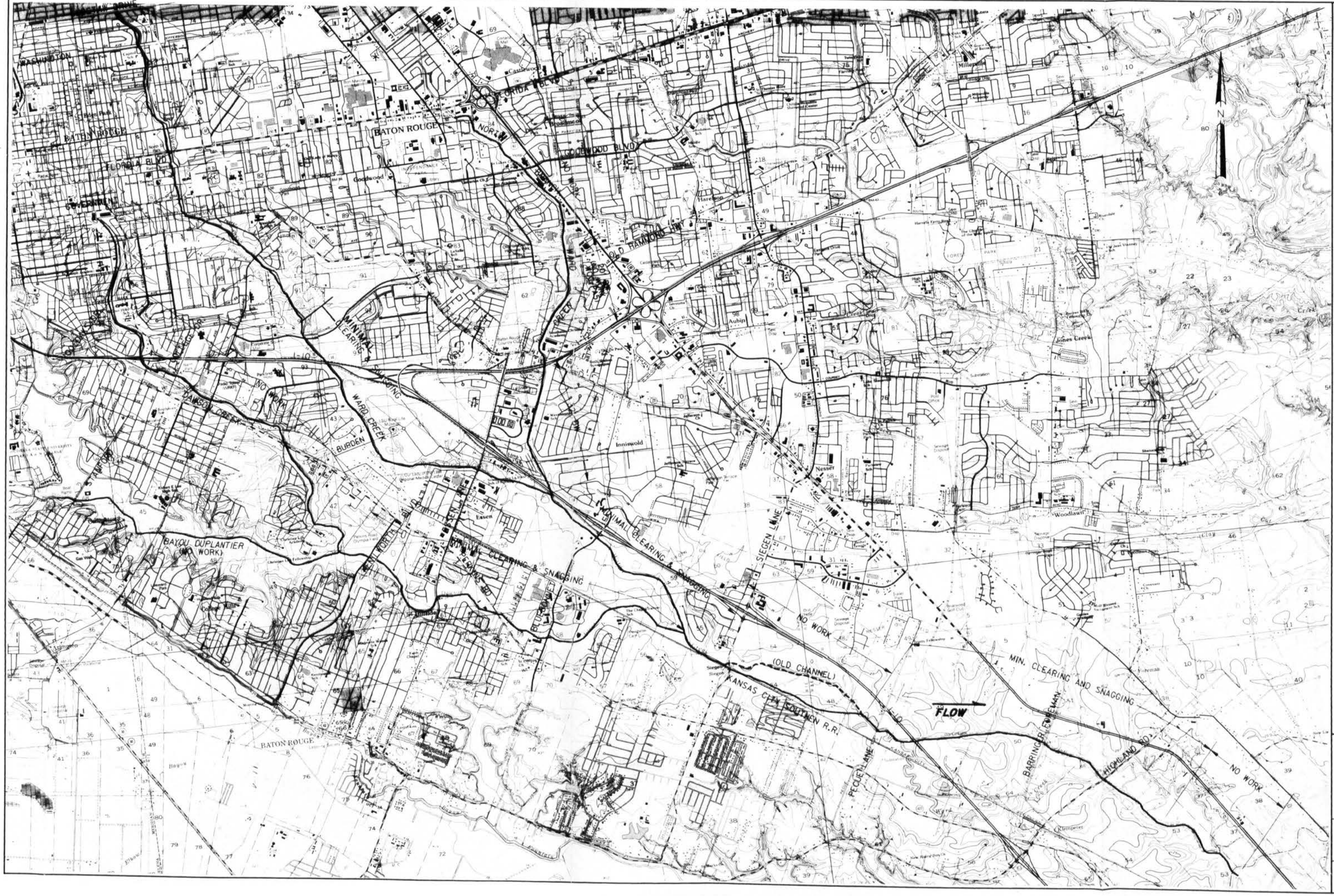
AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PARISH FEASIBILITY STUDY

WARD CREEK AND TRIBUTARIES

PLANS WCC-P4A1 and WCC-P4A2

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: FRANK VICI DRAWN BY: LOIS PIERRE CHECKED BY: FV	PLOT SCALE: AS SHOWN	PLOT DATE: N/A	CADD FILE: N/A
	DATE: SEPTEMBER 1994		FILE NO. H-4-40273



BW = PROPOSED CONCRETE BOTTOM WIDTHS
CONCRETE LINED SIDE SLOPES - 1.0V on 3.0H

SCALE IN MILES

1 MI. 0 1 MI.

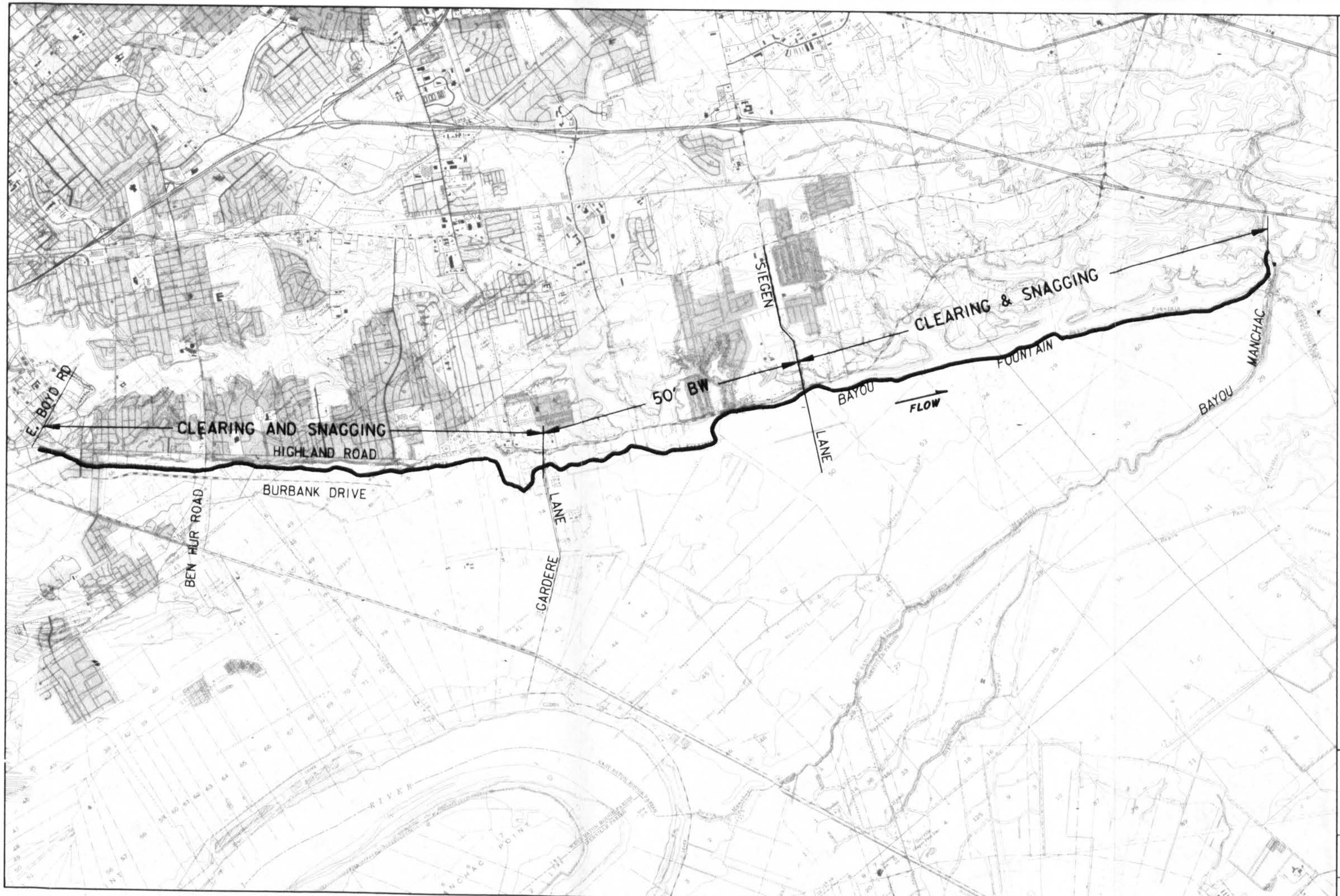
AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PARISH FEASIBILITY STUDY

WARD CREEK AND TRIBUTARIES

PLANS WCC-P4A5 and WCC-P4A6

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: FRANK VICI DRAWN BY: LOIS PIERRE CHECKED BY: FV	PLOT SCALE: AS SHOWN	PLOT DATE: N/A	CADD FILE: N/A
	DATE: SEPTEMBER 1994		FILE NO. H-4-40273



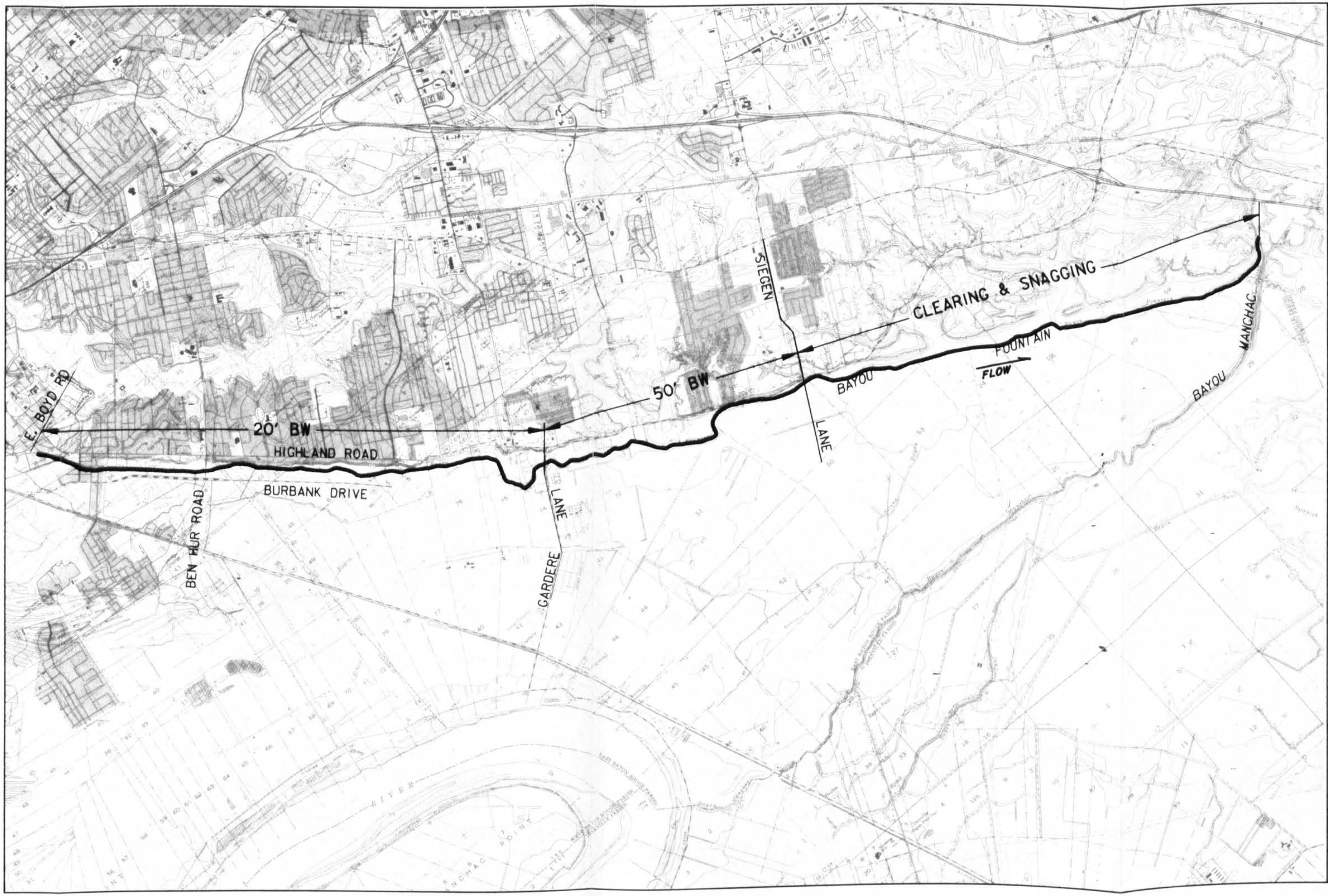
AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PAISH FEASIBILITY STUDY

BAYOU FOUNTAIN

BF10 - 10-YEAR EARTHEN CHANNEL

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: FV	PLOT SCALE: AS SHOWN	PLOT DATE: N/A	CADD FILE: N/A
DRAWN BY: LMP			FILE NO.
CHECKED BY: FV	DATE: SEPTEMBER 1994		H-4-40273



SCALE IN MILES

1MI. 0 1MI.

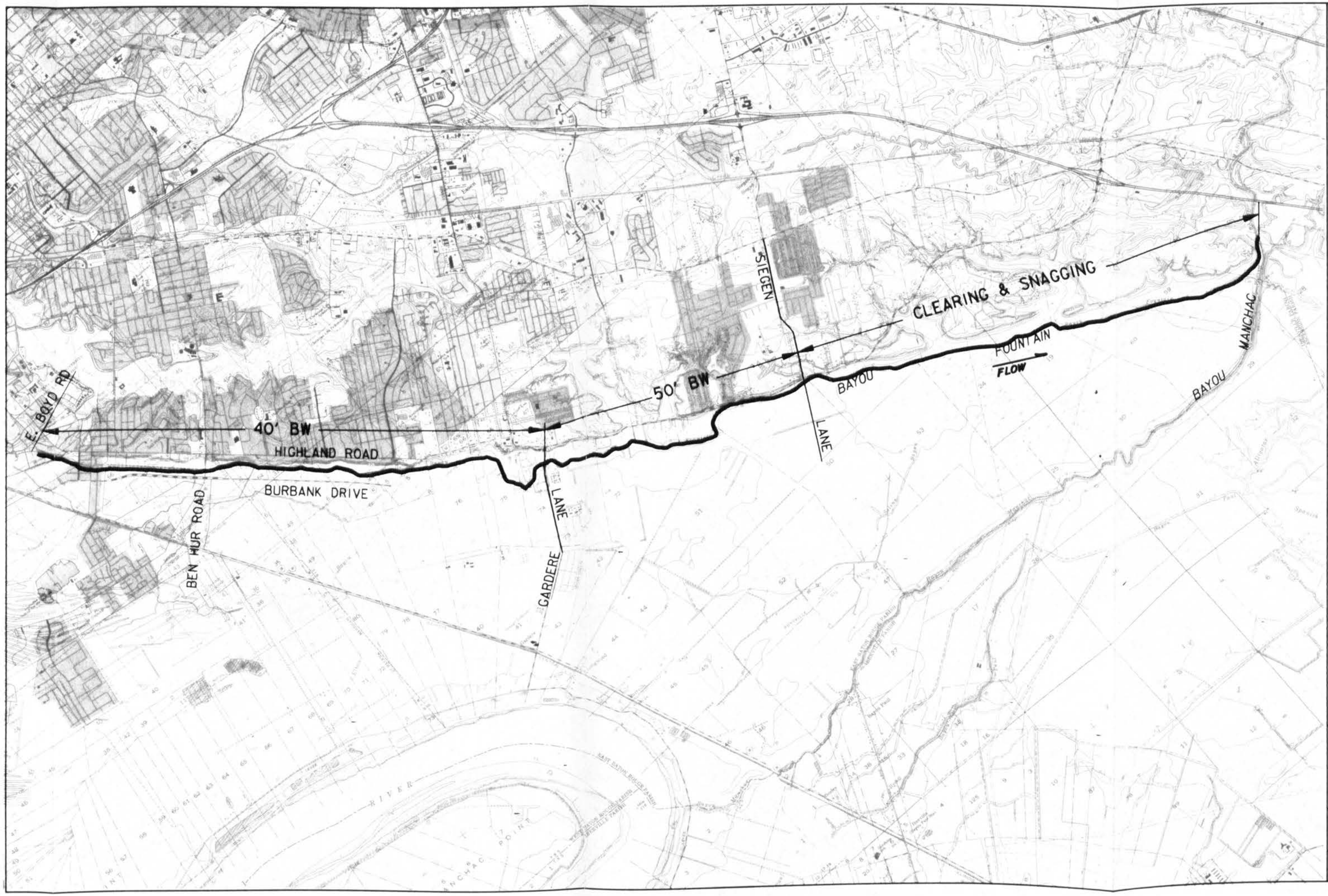
AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PAISH FEASIBILITY STUDY

BAYOU FOUNTAIN

BF25 - 25-YEAR EARTHEN CHANNEL

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: FV	PLOT SCALE: AS SHOWN	PLOT DATE: N/A	CADD FILE: N/A
DRAWN BY: LMP			FILE NO.
CHECKED BY: FV	DATE: SEPTEMBER 1994		H-4-40273



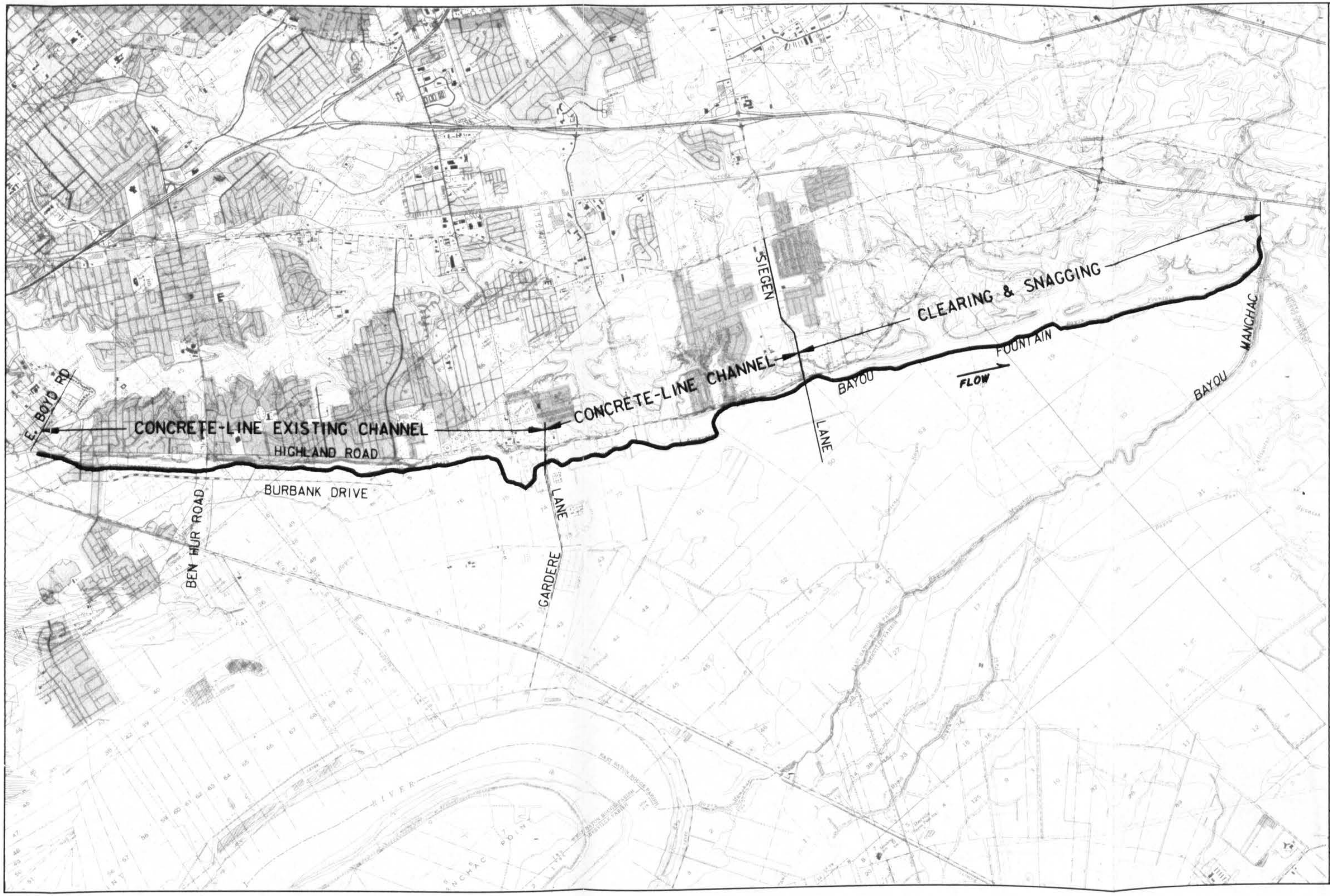
AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PAISH FEASIBILITY STUDY

BAYOU FOUNTAIN

BF50 - 50-YEAR EARTHEN CHANNEL

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: FV	PLOT SCALE:	PLOT DATE: N/A	CADD FILE: N/A
DRAWN BY: LMP	AS SHOWN		FILE NO.
CHECKED BY: FV	DATE: SEPTEMBER 1994		H-4-40273



N

SCALE IN MILES

1 MI. 0 1 MI.

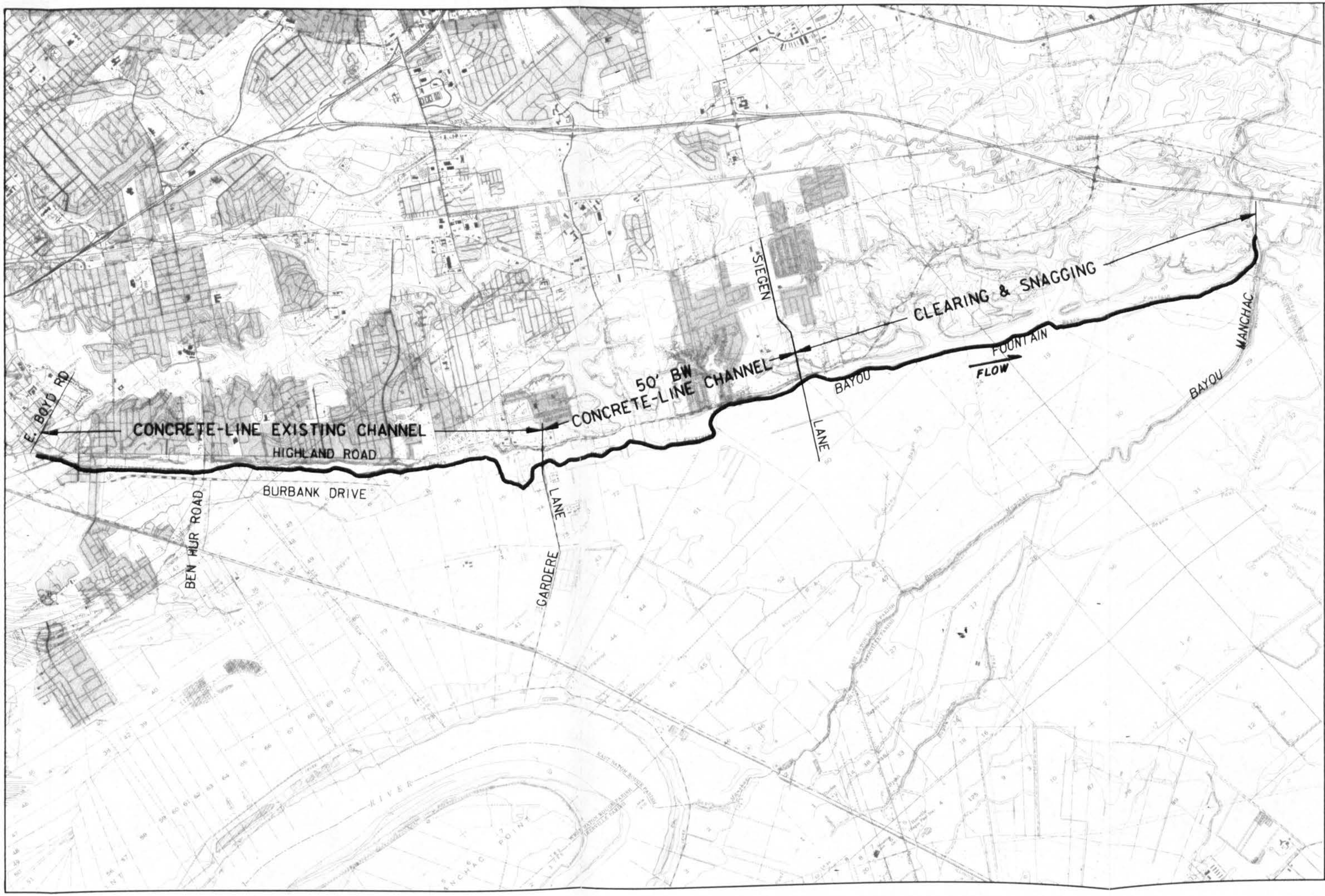
AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PAISH FEASIBILITY STUDY

BAYOU FOUNTAIN

BF25C - 25-YEAR CONCRETE-LINED CHANNEL

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: FV	PLOT SCALE: AS SHOWN	PLOT DATE: N/A	CADD FILE: N/A
DRAWN BY: LMP			FILE NO.
CHECKED BY: FV	DATE: SEPTEMBER 1994		H-4-40273



SCALE IN MILES

1MI. 0 1MI.

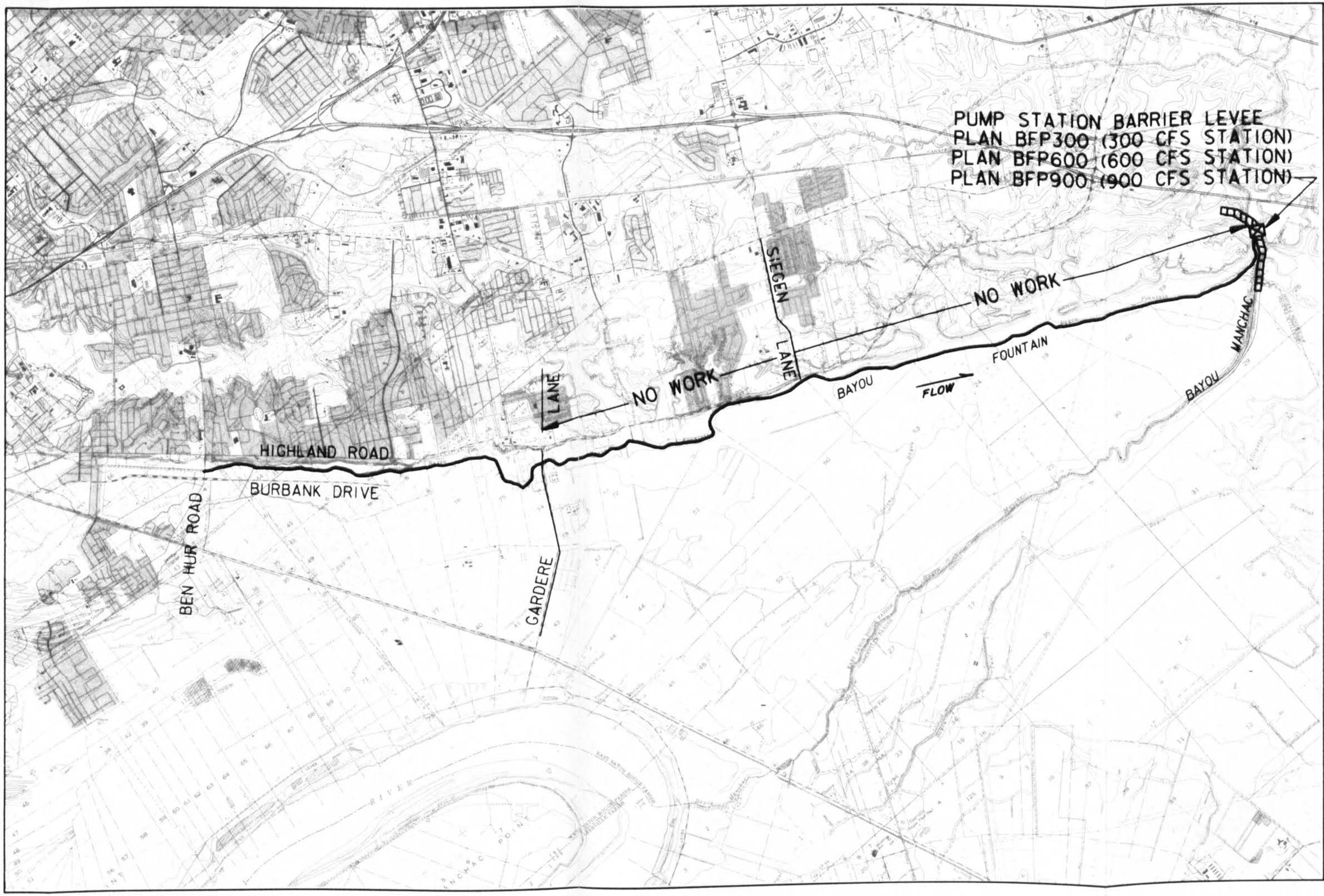
AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PAISH FEASIBILITY STUDY

BAYOU FOUNTAIN

BF50C - 50-YEAR CONCRETE-LINED CHANNEL

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: FV	PLOT SCALE: AS SHOWN	PLOT DATE: N/A	CADD FILE: N/A
DRAWN BY: LMP			FILE NO.
CHECKED BY: FV	DATE: SEPTEMBER 1994		H-4-40273



SCALE IN MILES

1MI. 0 1MI.

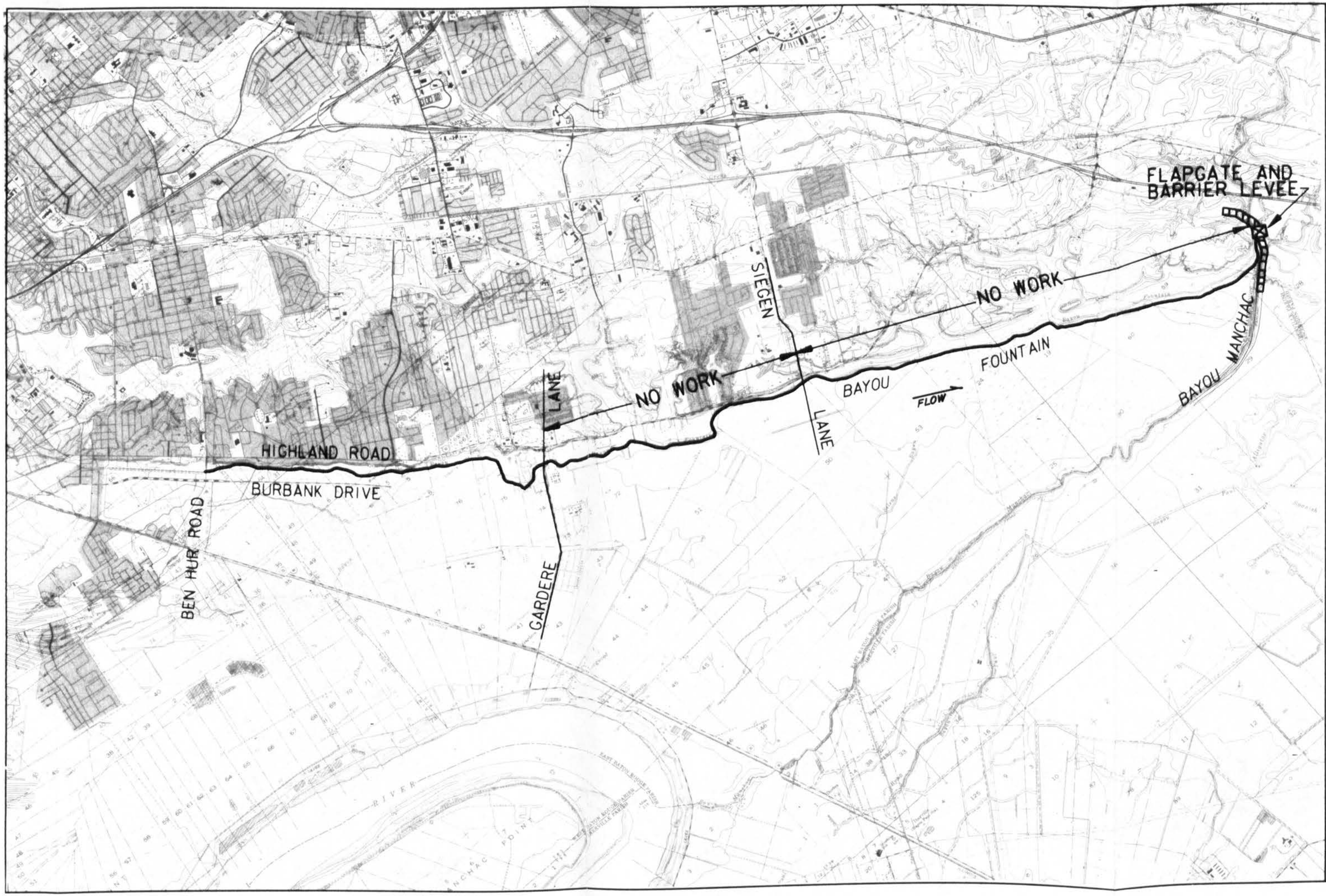
AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PAISH FEASIBILITY STUDY

BAYOU FOUNTAIN

PLANS BFP300, BFP600 & BFP900

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: FV	PLOT SCALE:	PLOT DATE:	CADD FILE: N/A
DRAWN BY: LOIS PIERRE	AS SHOWN	N/A	FILE NO.
CHECKED BY: FV	DATE: SEPTEMBER 1994		H-4-40273



SCALE IN MILES

1 MI. 0 1 MI.

AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PAISH FEASIBILITY STUDY

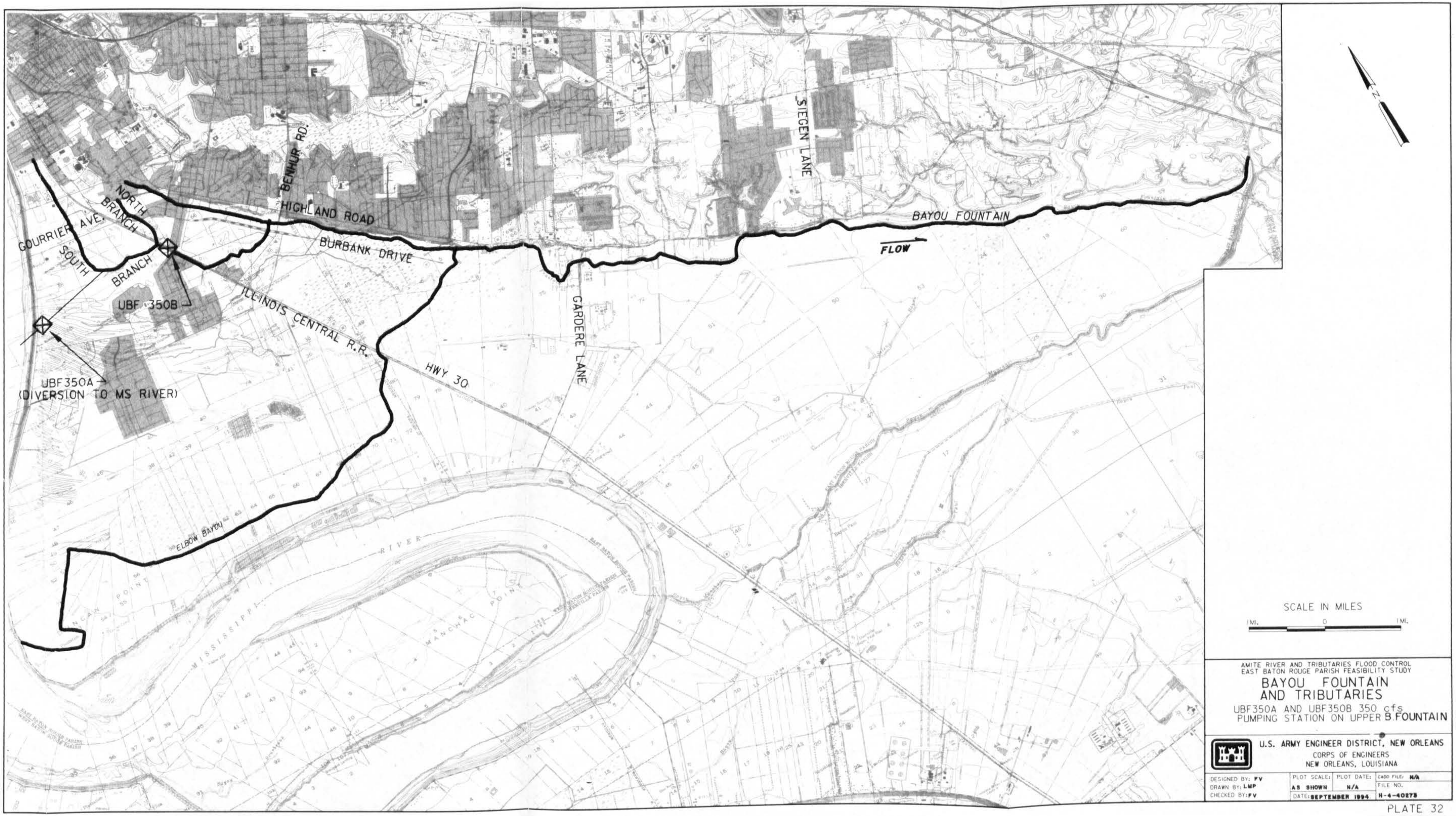
BAYOU FOUNTAIN

BFGATE - BACKATER FLAPGATE
LOCATED at BAYOU'S MOUTH

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: FV	PLOT SCALE: AS SHOWN	PLOT DATE: N/A	CADD FILE: N/A
DRAWN BY: LOIS PIERRE			FILE NO.
CHECKED BY: FV	DATE: SEPTEMBER 1994		H-4-40273

PLATE 31



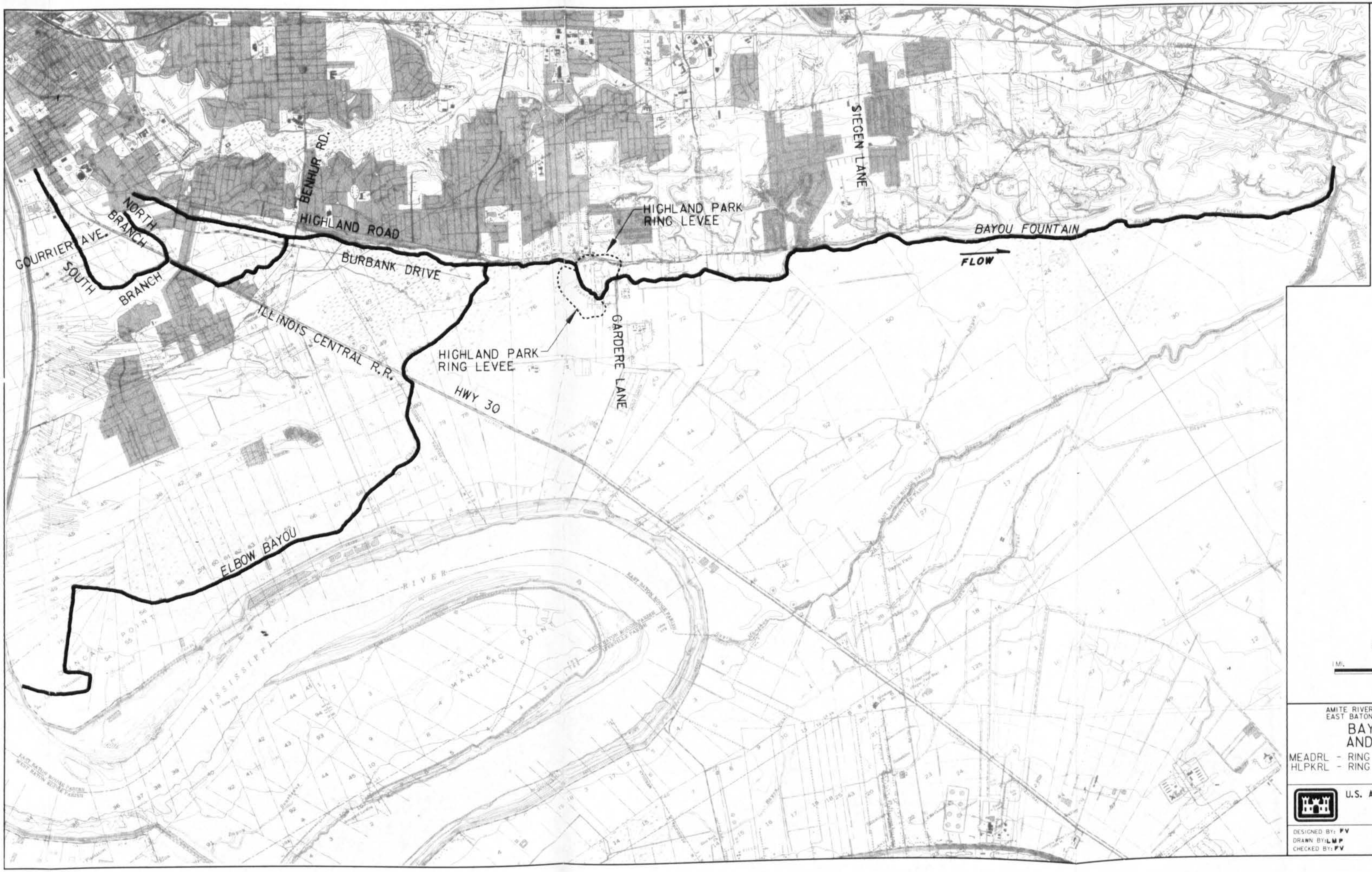
AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PARISH FEASIBILITY STUDY

BAYOU FOUNTAIN AND TRIBUTARIES

UBF350A AND UBF350B 350 cfs
PUMPING STATION ON UPPER B.FOUNTAIN

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: FV	PLOT SCALE: AS SHOWN	PLOT DATE: N/A	CADD FILE: N/A
DRAWN BY: LMP			FILE NO.
CHECKED BY: FV	DATE: SEPTEMBER 1994		H-4-40273



AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PARISH FEASIBILITY STUDY

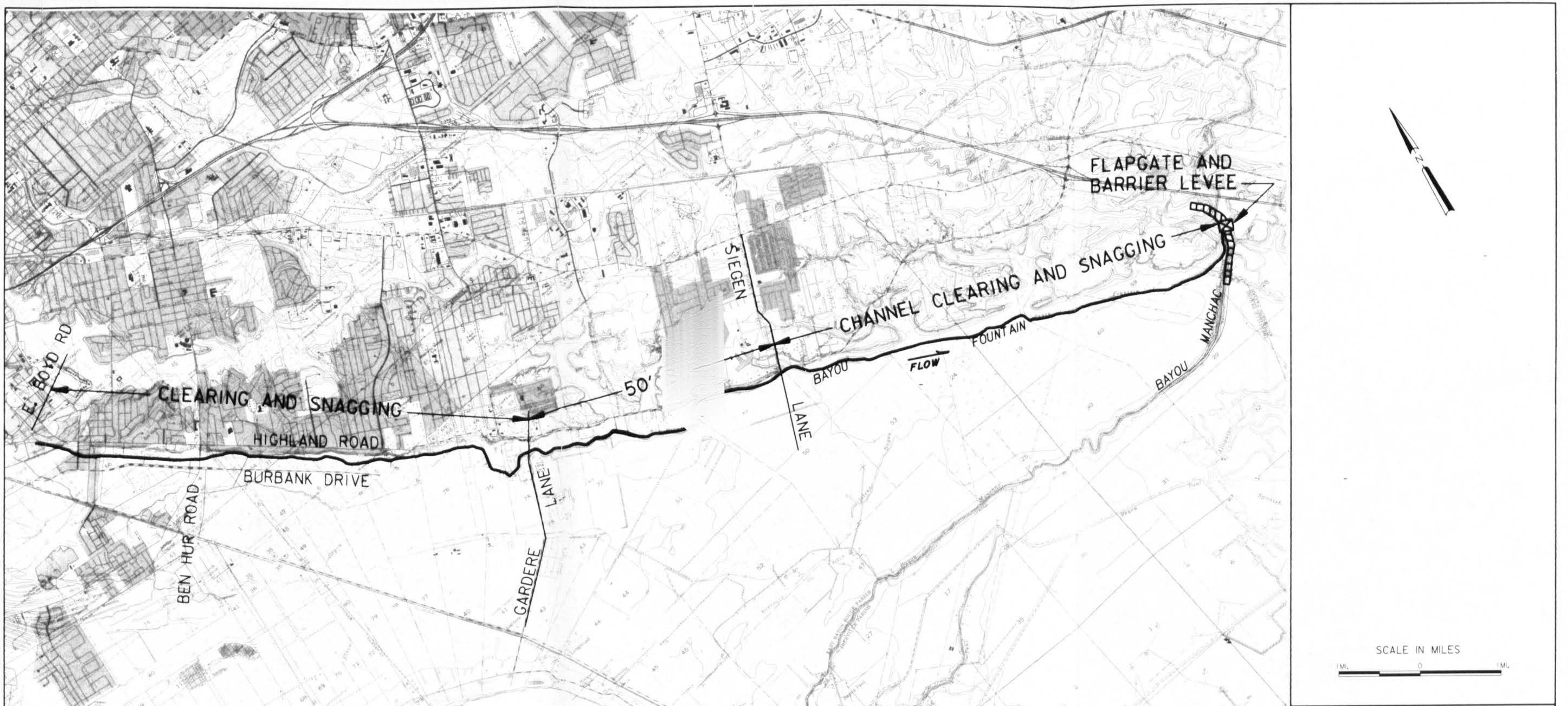
BAYOU FOUNTAIN AND TRIBUTARIES

MEADRL - RING LEVEE AROUND MEADOW BEND
HLPKRL - RING LEVEE AROUND HIGHLAND PARK SUBDIVISIONS

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: FV	PLOT SCALE: AS SHOWN	PLOT DATE: N/A	CADD FILE: N/A
DRAWN BY: LMP			FILE NO.
CHECKED BY: FV	DATE: SEPTEMBER 1994		H-4-40273

PLATE 33



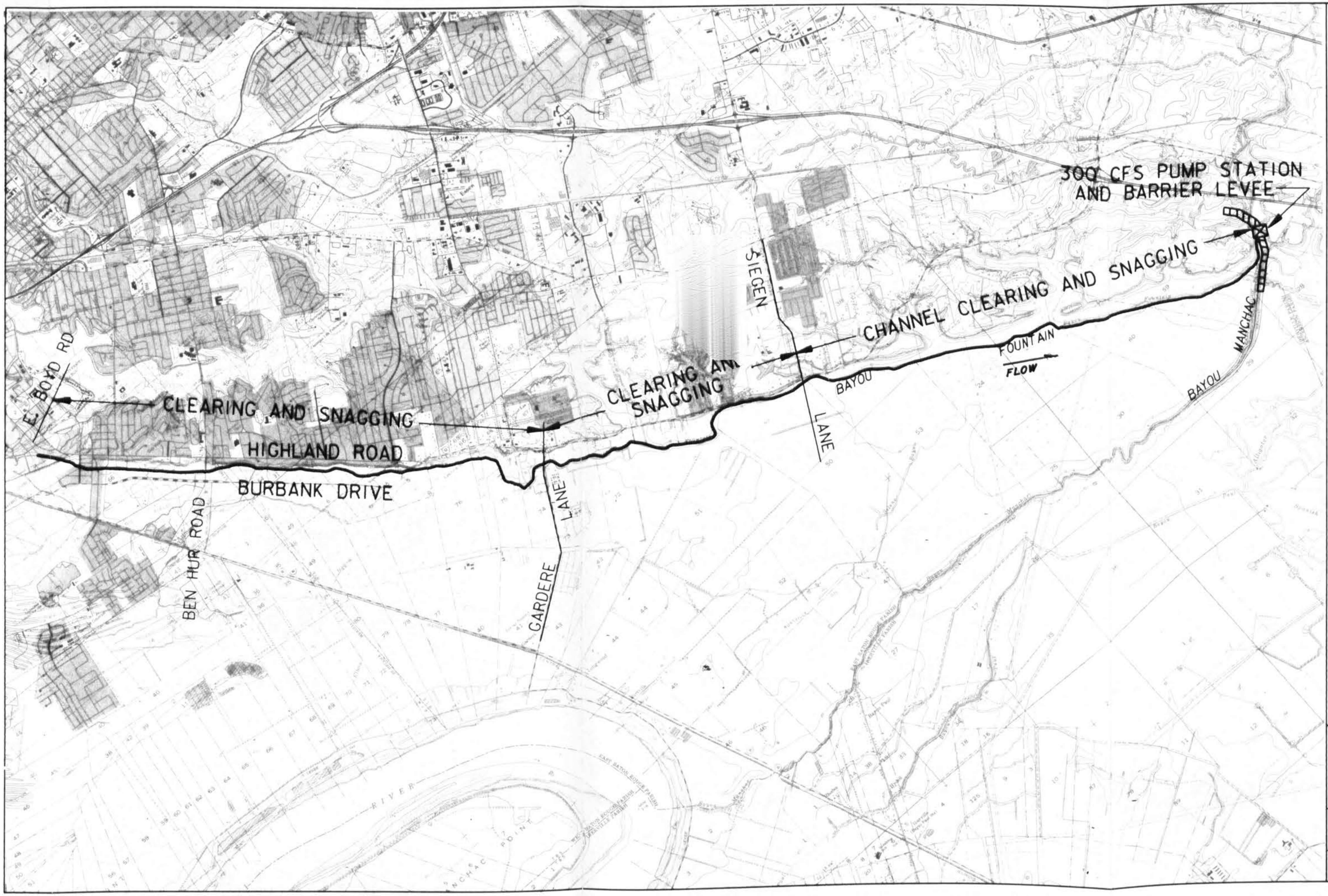
AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PAISH FEASIBILITY STUDY

BAYOU FOUNTAIN

BF10 - BFGATE - 10-YEAR EARTHEN CHANNEL with
BACKWATER FLAPGATE LOCATED at BAYOU'S MOUTH

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: FV	PLOT SCALE: AS SHOWN	PLOT DATE: N/A	CADD FILE: N/A
DRAWN BY: LOIS PIERRE			FILE NO.
CHECKED BY: FV	DATE: SEPTEMBER 1994		H-4-40273



SCALE IN MILES

1MI. 0 1MI.

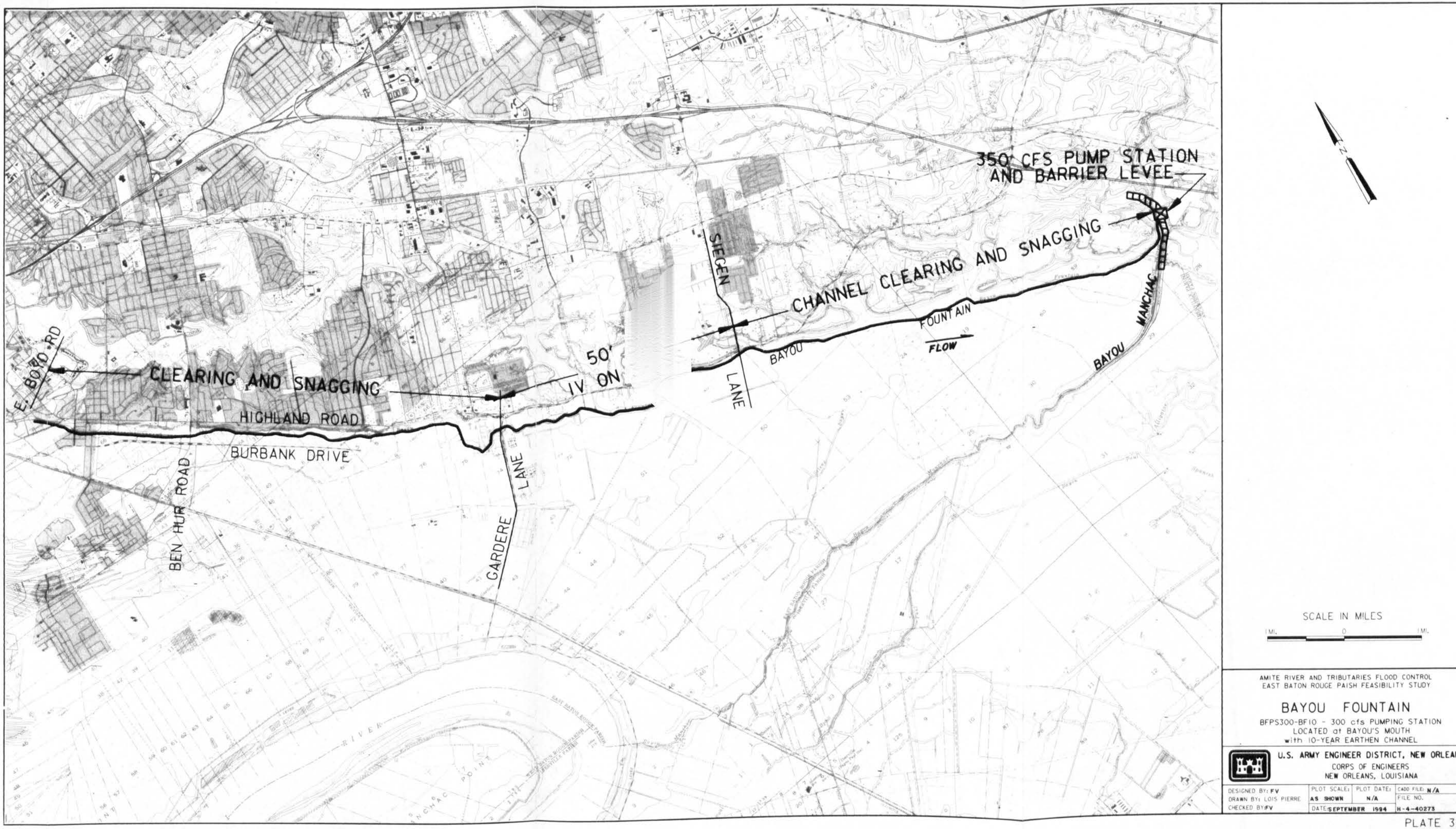
AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PAISH FEASIBILITY STUDY

BAYOU FOUNTAIN

BFPS300 - C/S - 300 cfs PUMPING STATION
LOCATED at BAYOU'S MOUTH
with CHANNEL CLEARING AND SNAGGING

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: FV	PLOT SCALE: AS SHOWN	PLOT DATE: N/A	CADD FILE: NA
DRAWN BY: LOIS PIERRE			FILE NO.
CHECKED BY: FV	DATE: SEPTEMBER 1994		H-4-40273



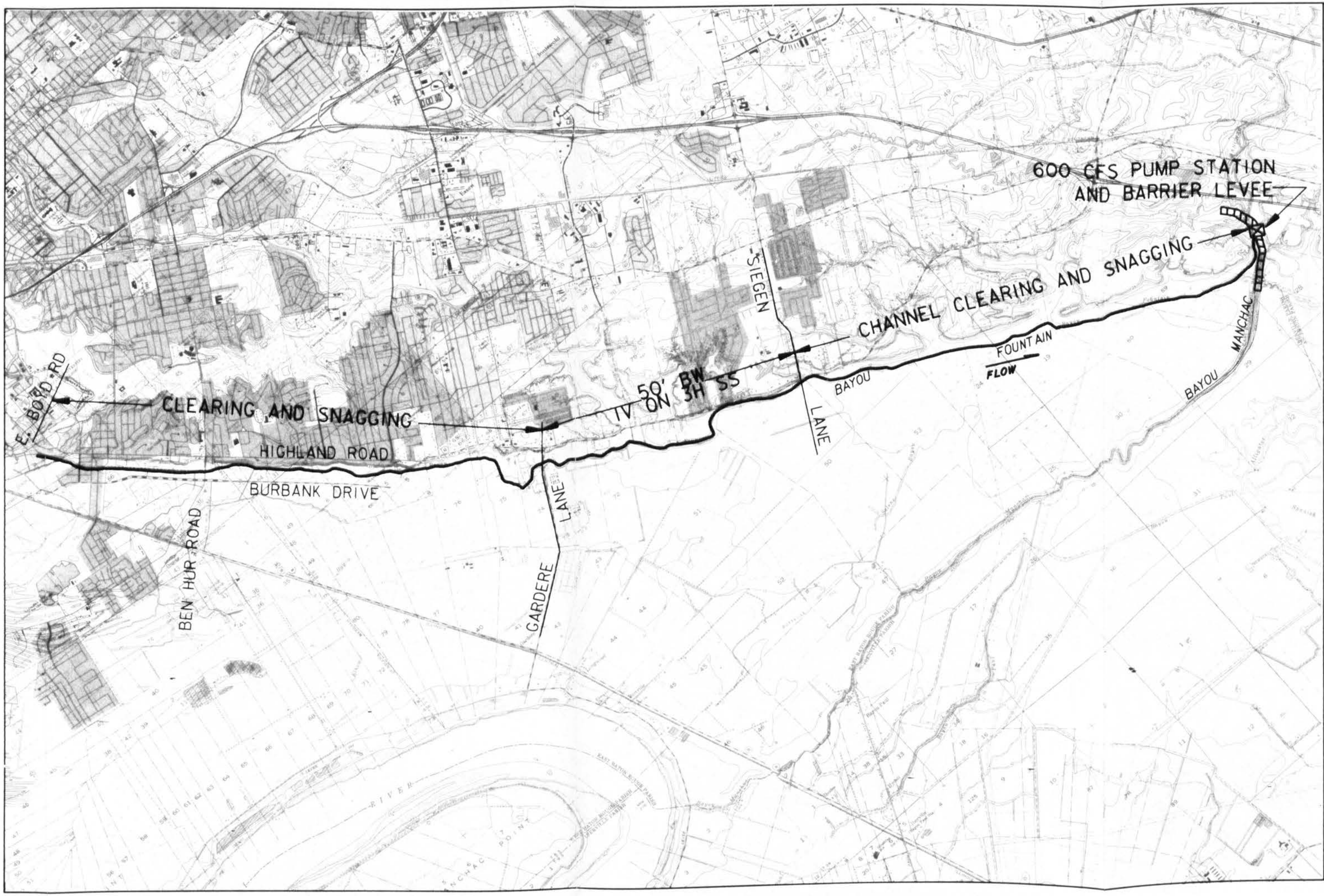
AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PAISH FEASIBILITY STUDY

BAYOU FOUNTAIN

BFPS300-BF10 - 300 cfs PUMPING STATION
LOCATED at BAYOU'S MOUTH
with 10-YEAR EARTHEN CHANNEL

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: FV	PLOT SCALE: AS SHOWN	PLOT DATE: N/A	CADD FILE: N/A
DRAWN BY: LOIS PIERRE			FILE NO.
CHECKED BY: FV	DATE: SEPTEMBER 1994		H-4-40273



SCALE IN MILES
1MI. 0 1MI.

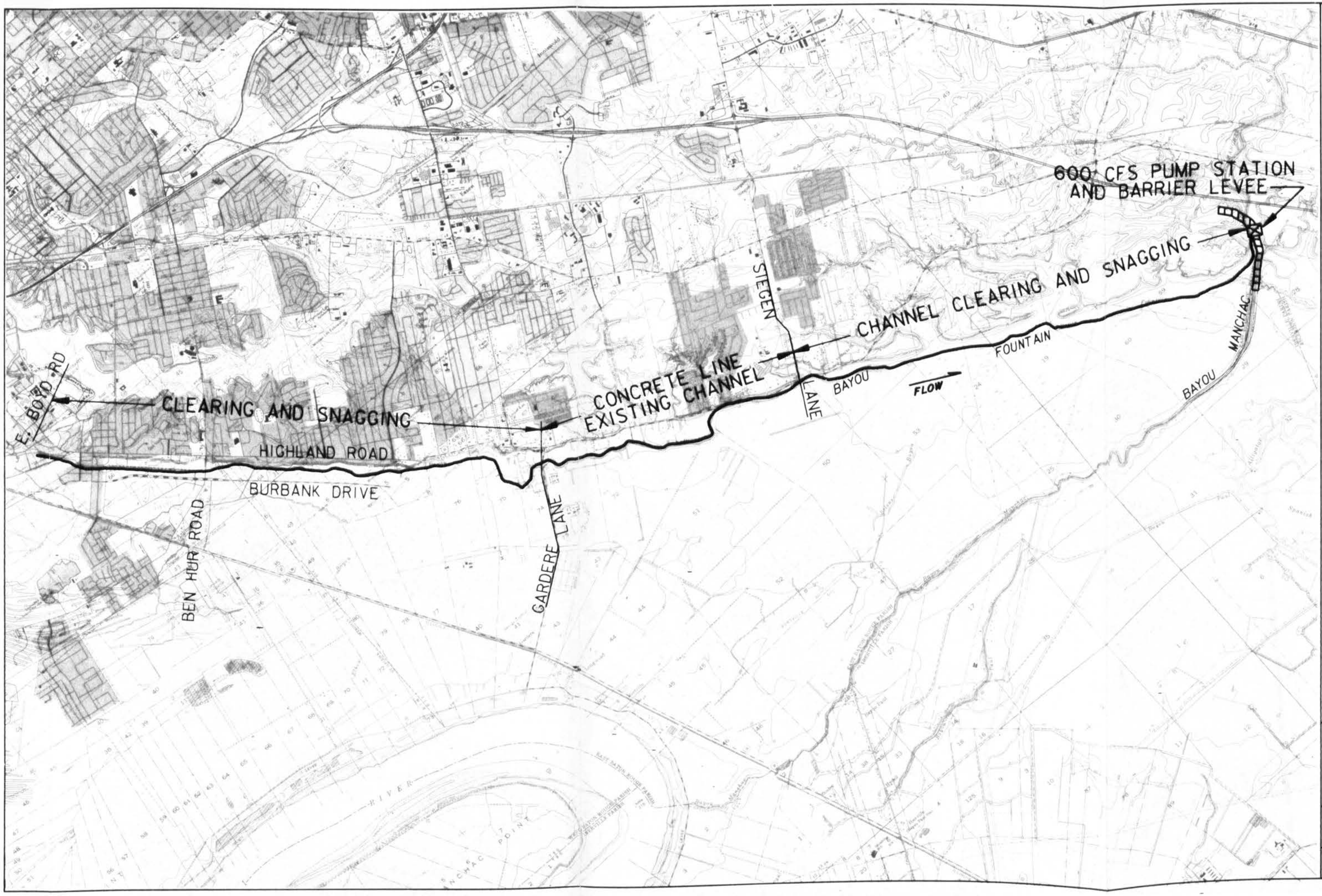
AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PAISH FEASIBILITY STUDY

BAYOU FOUNTAIN

BFPS600-BF10 - 600 cfs PUMPING STATION
LOCATED at BAYOU'S MOUTH
with 10-YEAR EARTHEN CHANNEL

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: FV	PLOT SCALE:	PLOT DATE:	CADD FILE: N/A
DRAWN BY: LOIS PIERRE	AS SHOWN	N/A	FILE NO.
CHECKED BY: FV	DATE: SEPTEMBER 1994		H-4-40273



SCALE IN MILES

1 MI. 0 1 MI.

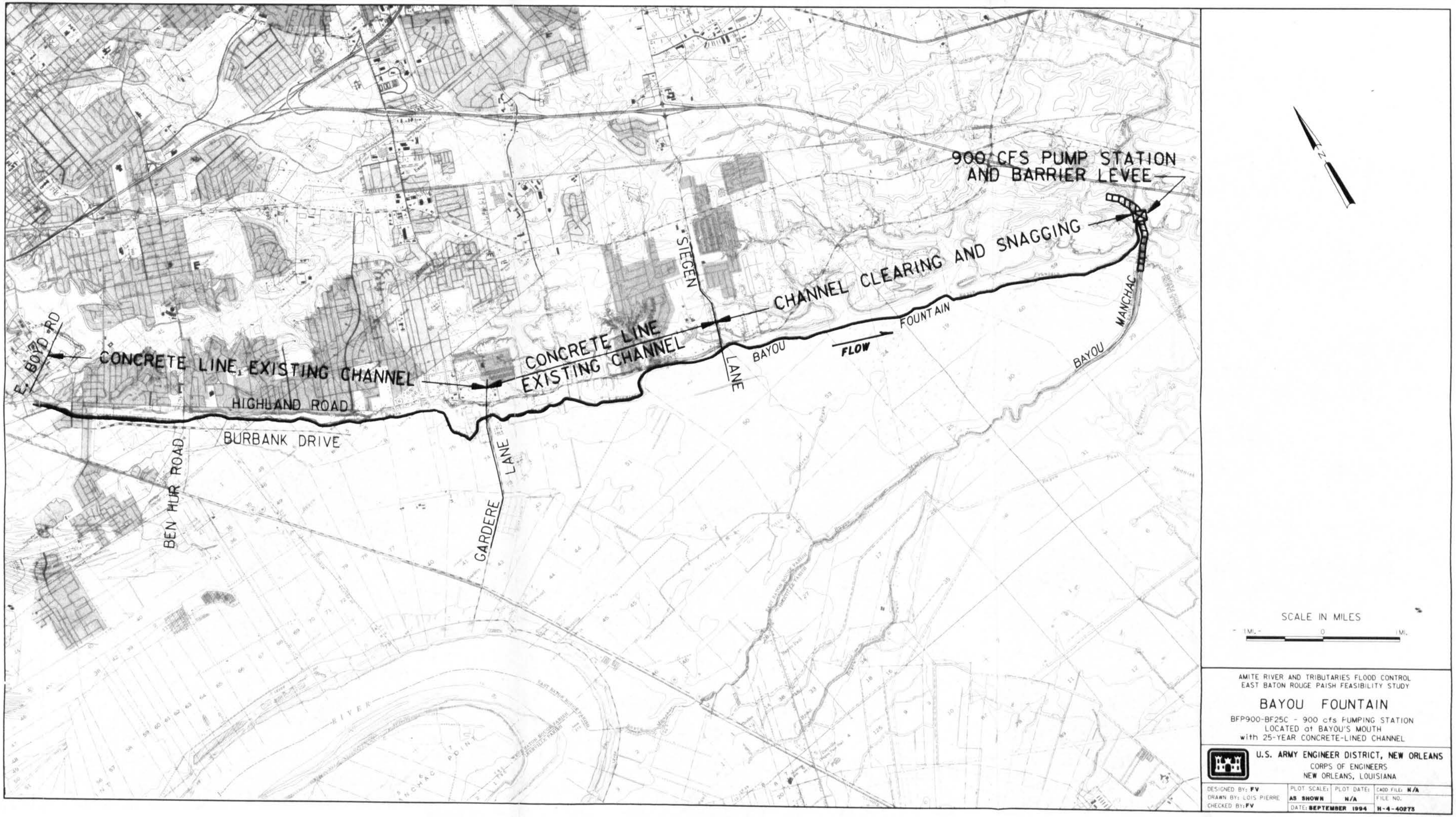
AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PAISH FEASIBILITY STUDY

BAYOU FOUNTAIN

BFPS600-BF25 - 600 cfs PUMPING STATION
LOCATED at BAYOU'S MOUTH
with 25-YEAR CONCRETE-LINED CHANNEL

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: **FV**	PLOT SCALE: **AS SHOWN**	PLOT DATE: **N/A**	CADD FILE: **N/A**
DRAWN BY: LOIS PIERRE			FILE NO.
CHECKED BY: **FV**	DATE: **SEPTEMBER 1994**		**H-4-40273**



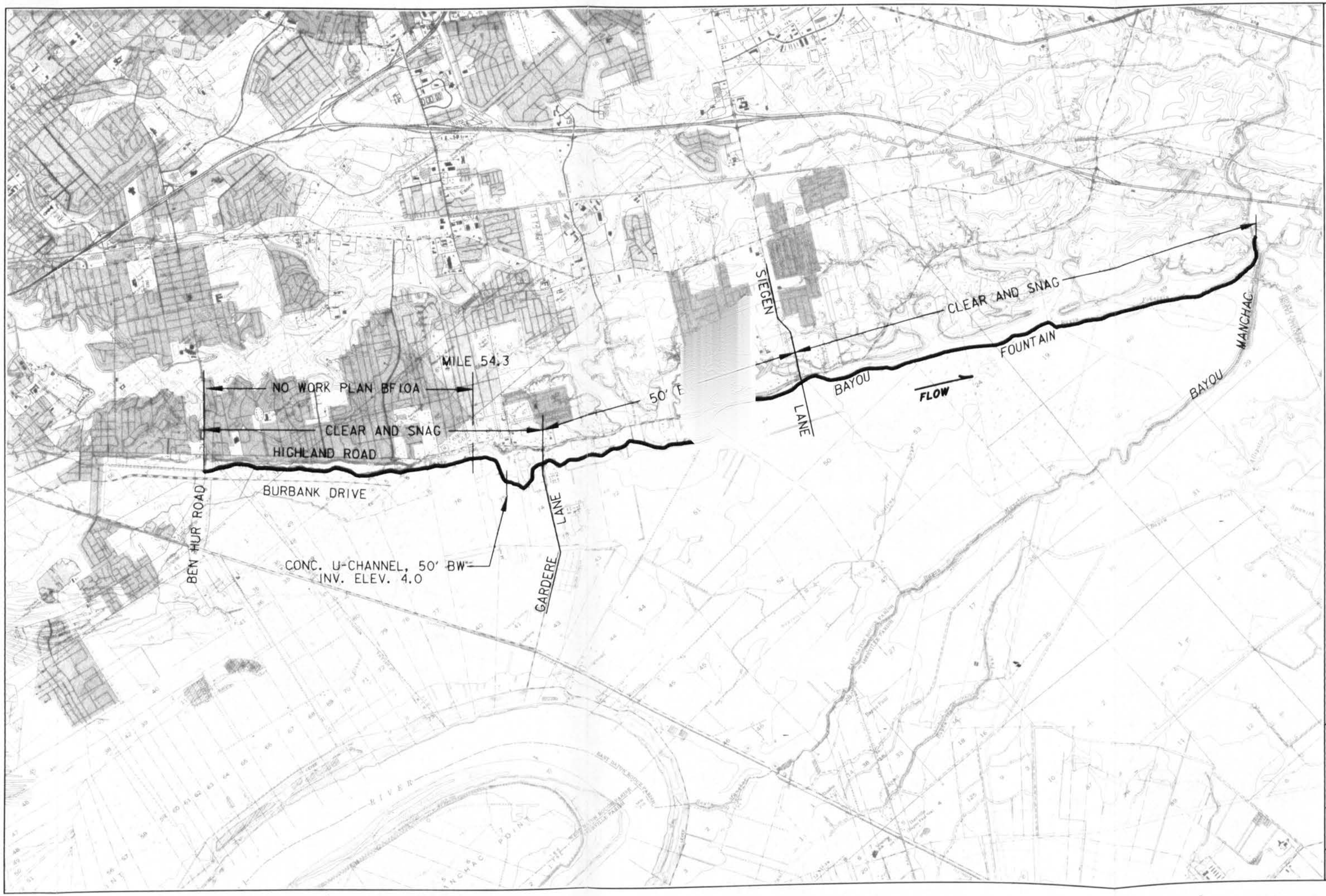
AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PAISH FEASIBILITY STUDY

BAYOU FOUNTAIN

BFP900-BF25C - 900 cfs PUMPING STATION
LOCATED at BAYOU'S MOUTH
with 25-YEAR CONCRETE-LINED CHANNEL

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: FV	PLOT SCALE: AS SHOWN	PLOT DATE: N/A	CADD FILE: N/A
DRAWN BY: LOIS PIERRE	DATE: SEPTEMBER 1994		FILE NO. H-4-40273
CHECKED BY: FV			



SCALE IN MILES

1 MI. 0 1 MI.

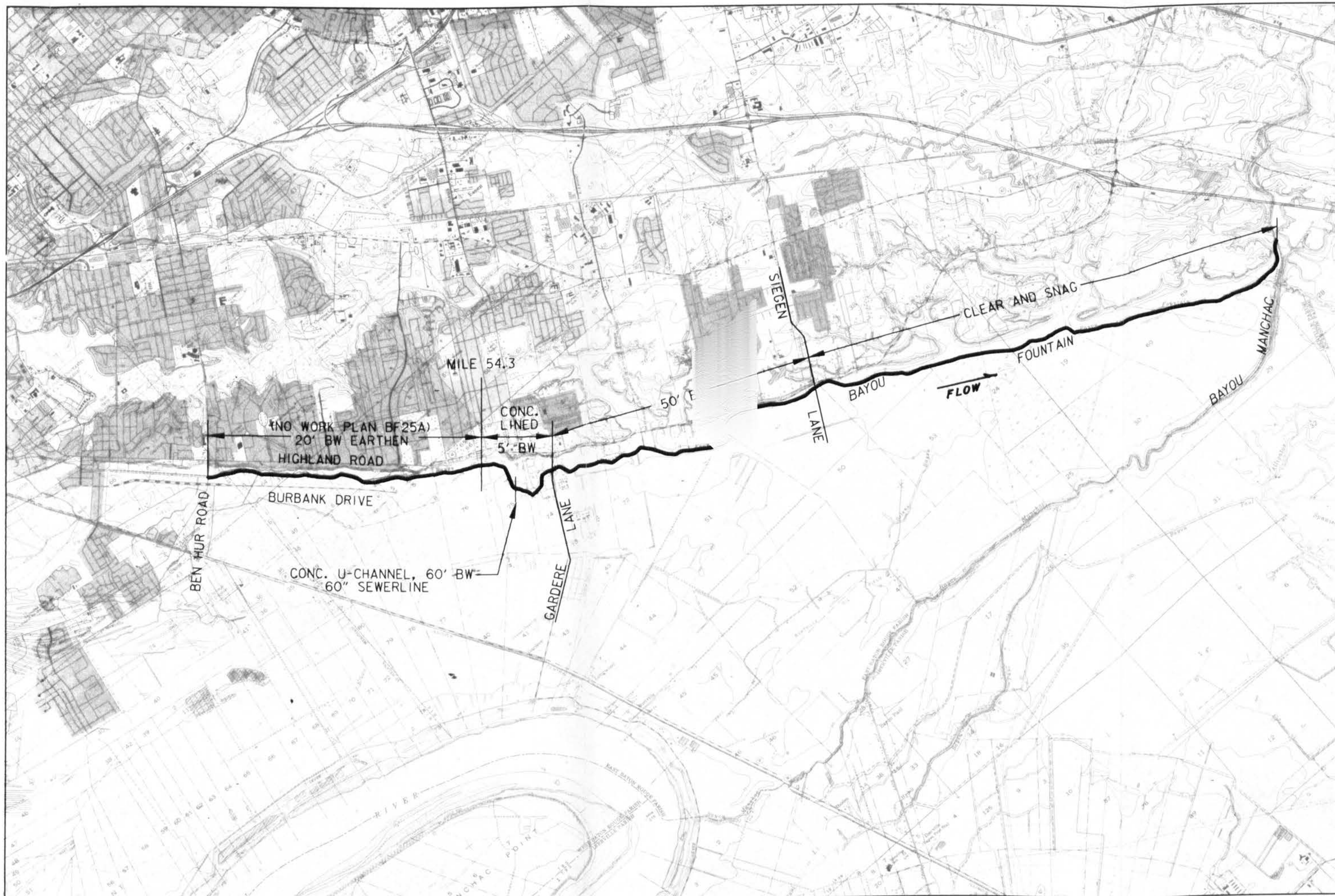
AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PAISH FEASIBILITY STUDY

BAYOU FOUNTAIN

PLANS BF10A AND BF10B

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: FV	PLOT SCALE:	PLOT DATE:	CADD FILE: N/A
DRAWN BY: LOIS PIERRE	AS SHOWN	N/A	FILE NO.
CHECKED BY: FV	DATE: SEPTEMBER 1994		H-4-40273



SCALE IN MILES

1 MI. 0 1 MI.

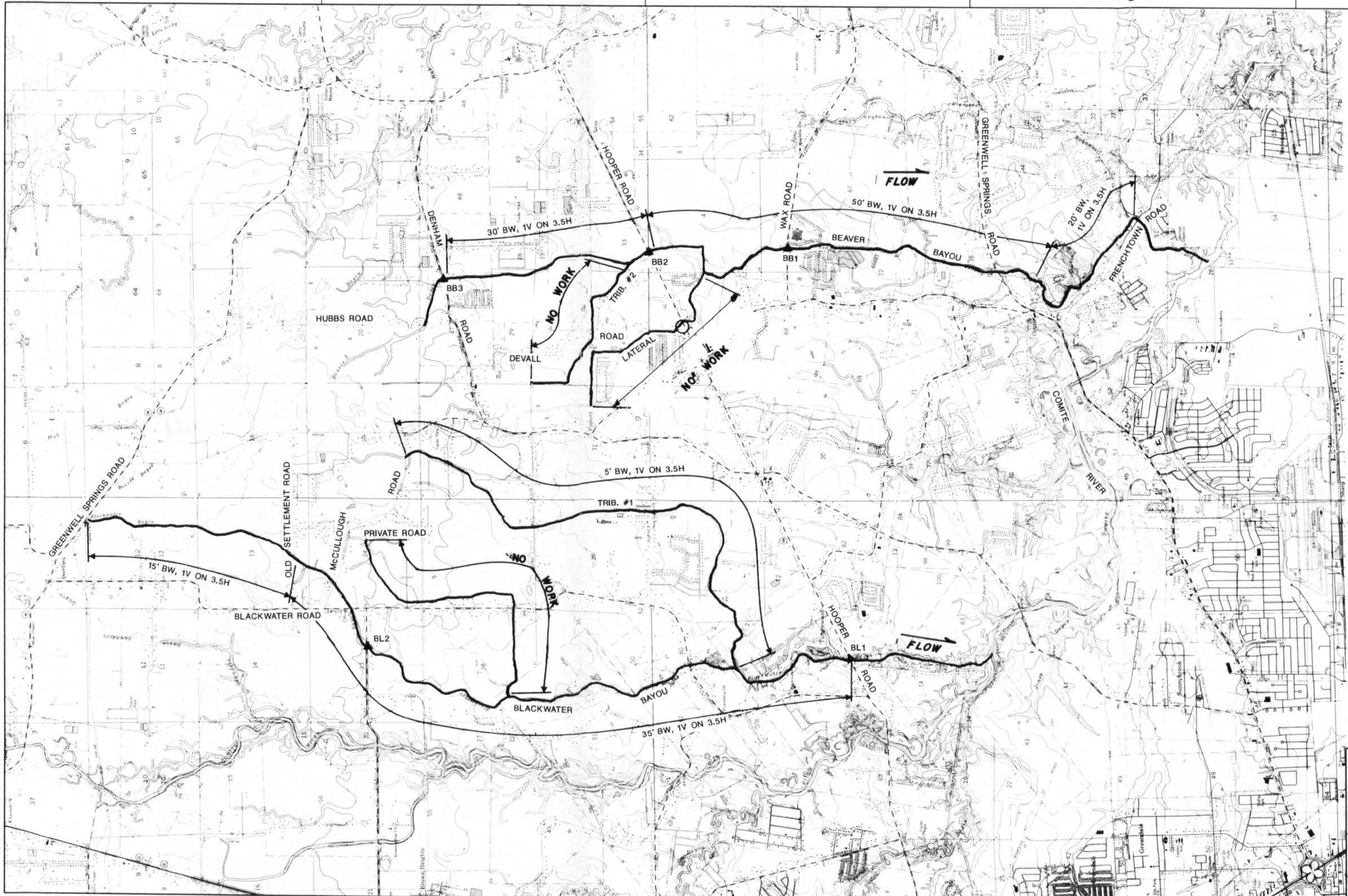
AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PAISH FEASIBILITY STUDY

BAYOU FOUNTAIN

PLANS BF25A AND BF1025B

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: FV	PLOT SCALE:	PLOT DATE:	CADD FILE: N/A
DRAWN BY: LOIS PIERRE	AS SHOWN	N/A	FILE NO.
CHECKED BY: FV	DATE: SEPTEMBER 1994		H-4-40273



N

LEGEND

▲ - STREAM GAGE (Refer to Table C-I-7 for Descriptions)

SCALE IN MILES

1 MI. 0 1 MI.

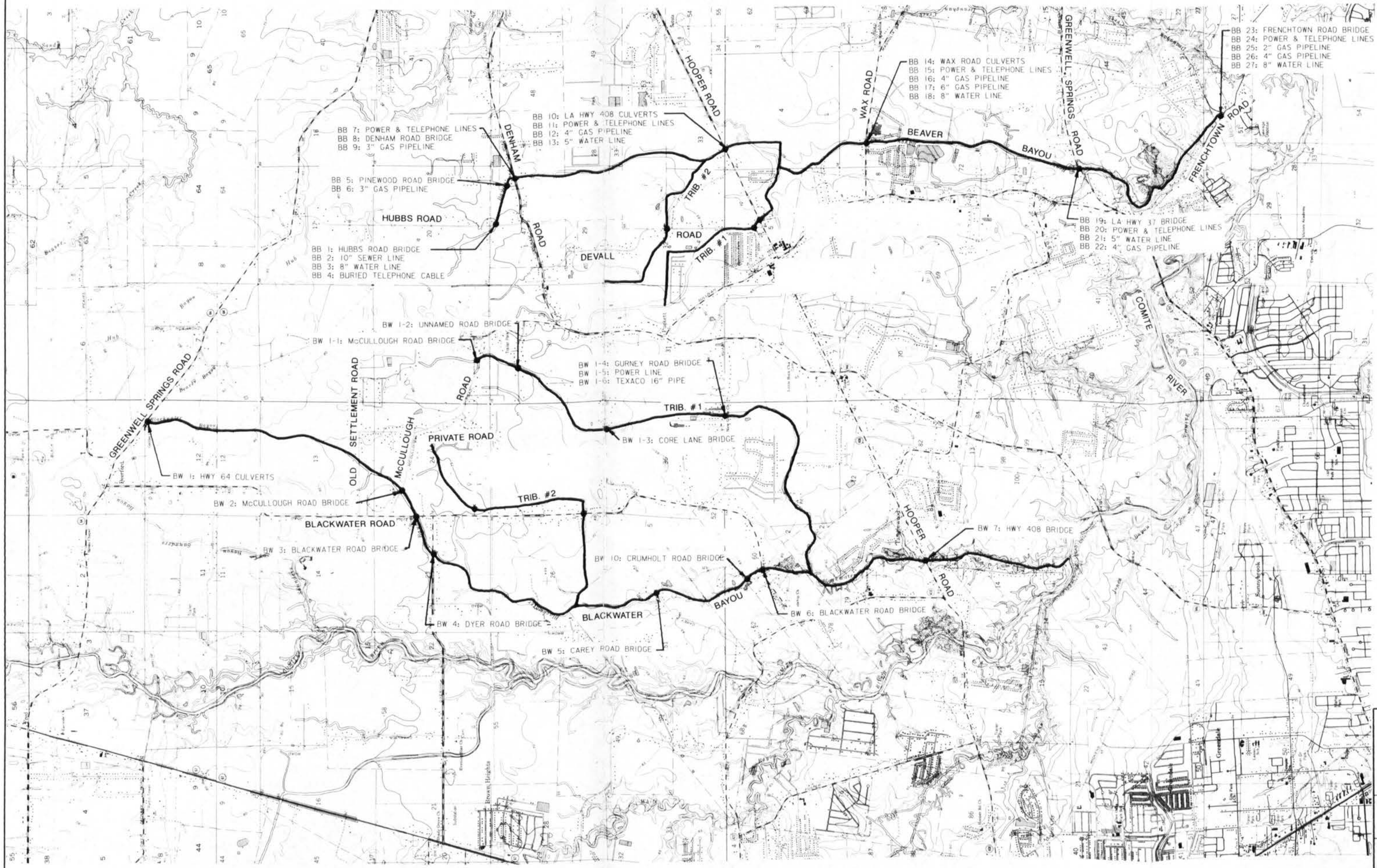
AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PARISH FEASIBILITY STUDY

BLACKWATER AND BEAVER BAYOU
TENTATIVELY SELECTED PLAN

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: FV	PLOT SCALE: AS SHOWN	PLOT DATE: N/A	CADD FILE: N/A
DRAWN BY: LMP			FILE NO.
CHECKED BY: FV	DATE: SEPTEMBER 1994		H-4-40273

PLATE 42



AMITE RIVER & TRIBUTARIES
EAST BATON ROUGE PARISH

Beaver Bayou and Tributaries,
Blackwater Bayou and Tributaries
and
Bayou Fountain

Legend:

BB - Beaver Bayou
BBL - Beaver Bayou Lateral
BBT - Beaver Bayou Tributary #2
BW - Blackwater Bayou
BW1 - Blackwater Bayou Tributary #1
BW2 - Blackwater Bayou Tributary #2
BF - Bayou Fountain

NOTE: LOCATIONS OF FACILITIES DEPICTED ON THIS CHART ARE APPROXIMATE.

Prepared by CELMN-ED-SR, 14 Jan 93.

SCALE IN MILES

1 MI. 0 1 MI.

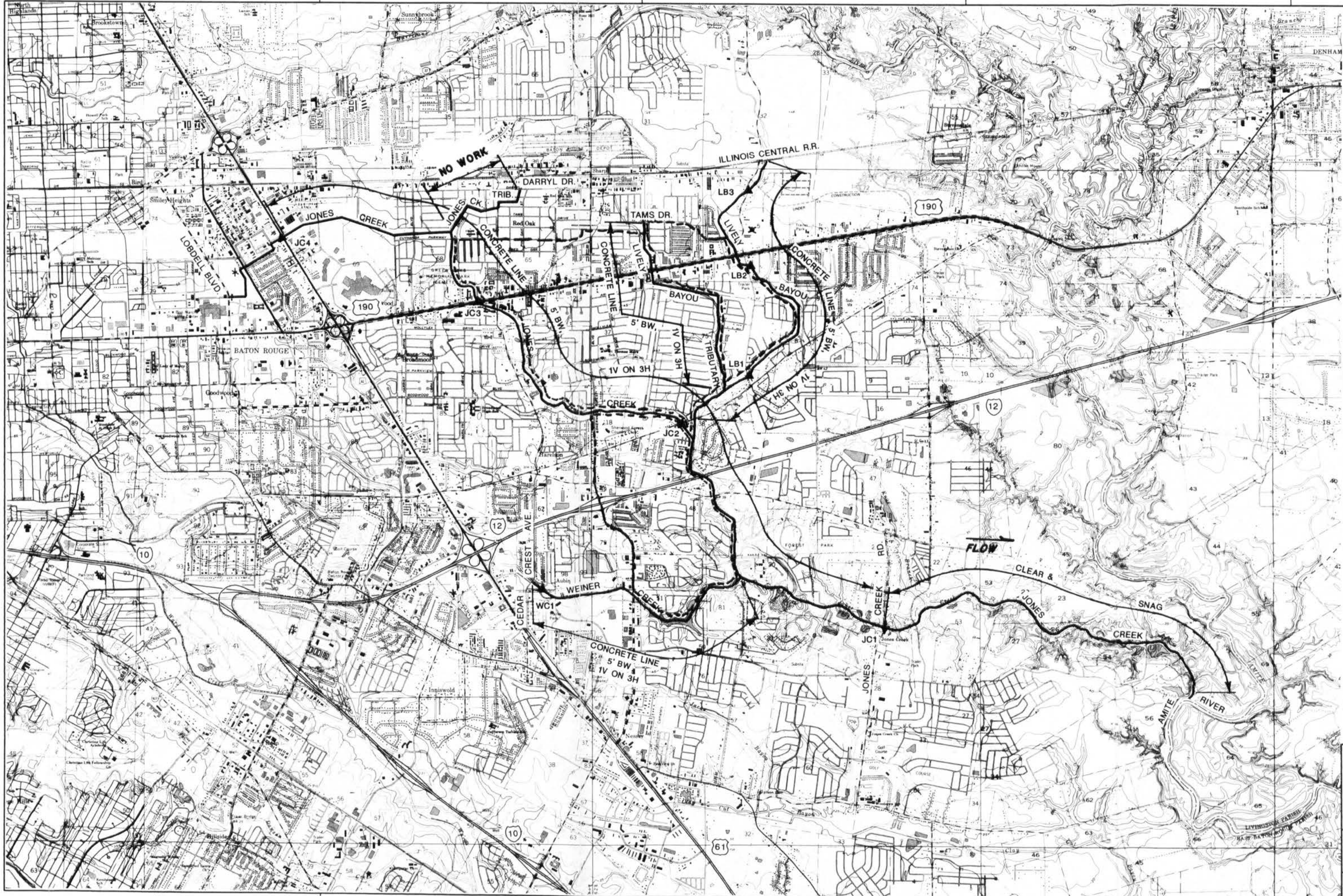
AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PARISH FEASIBILITY STUDY

BLACKWATER AND BEAVER BAYOU TENTATIVELY SELECTED PLAN RELOCATIONS

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: FV	PLOT SCALE: AS SHOWN	PLOT DATE: N/A	CADD FILE: N/A
DRAWN BY: LMP			FILE NO.
CHECKED BY: FV	DATE: SEPTEMBER 1994		H-4-40273

PLATE 43



LEGEND

▲ - STREAM GAGE (Refer to Table C-I-7 for Descriptions)

---BIKE PATH ROUTE

SCALE IN MILES

1 MI. 0 1 MI.

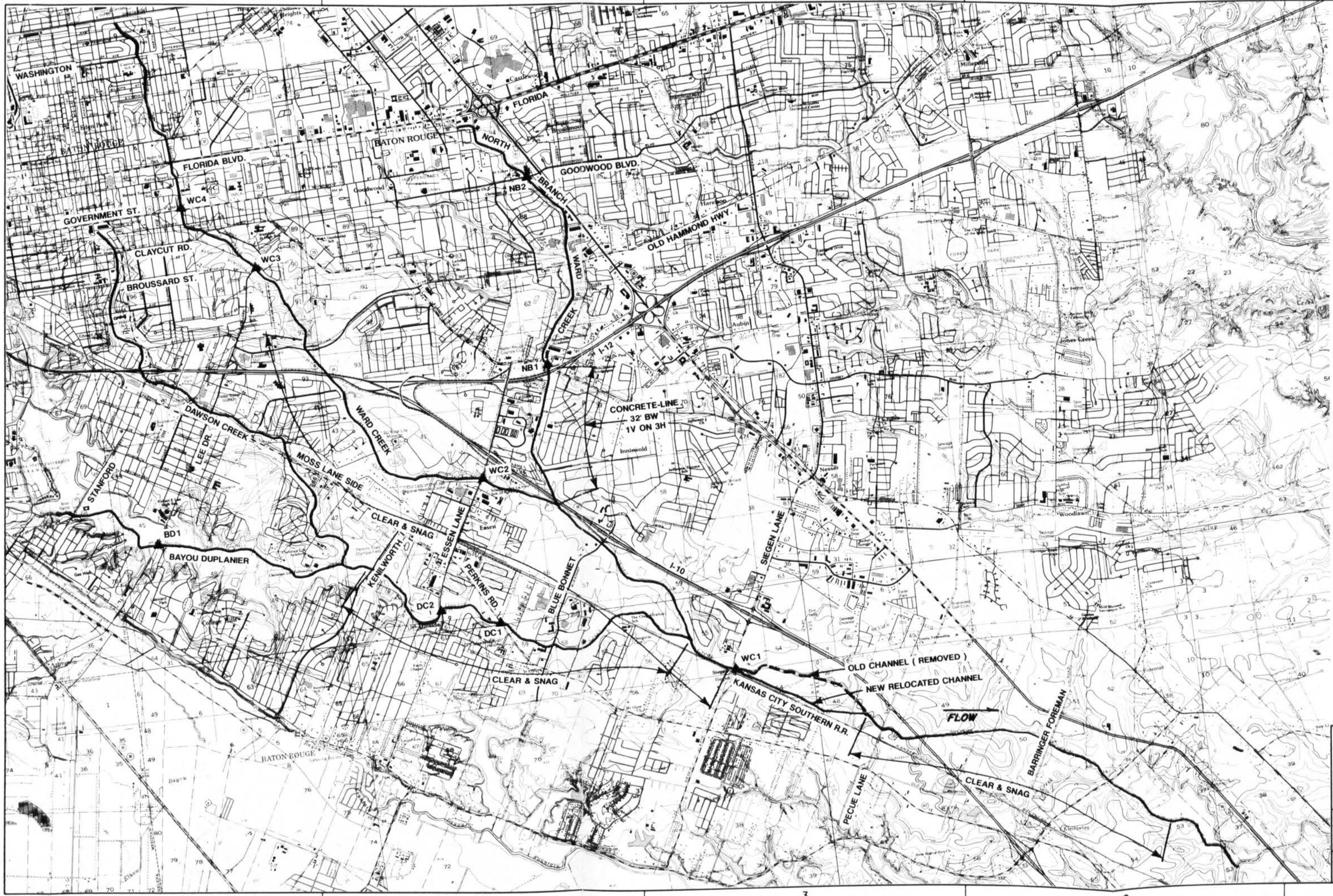
AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PARISH FEASIBILITY STUDY

JONES CREEK

TENTATIVELY SELECTED PLAN

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: FV	PLOT SCALE: AS SHOWN	PLOT DATE: N/A	CADD FILE: N/A
DRAWN BY: LMP			FILE NO.
CHECKED BY: FV	DATE: SEPTEMBER 1994		H 4-40273



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LEGEND

▲ - STREAM GAGE (Refer to Table C-I-7 for Descriptions)

SCALE IN MILES

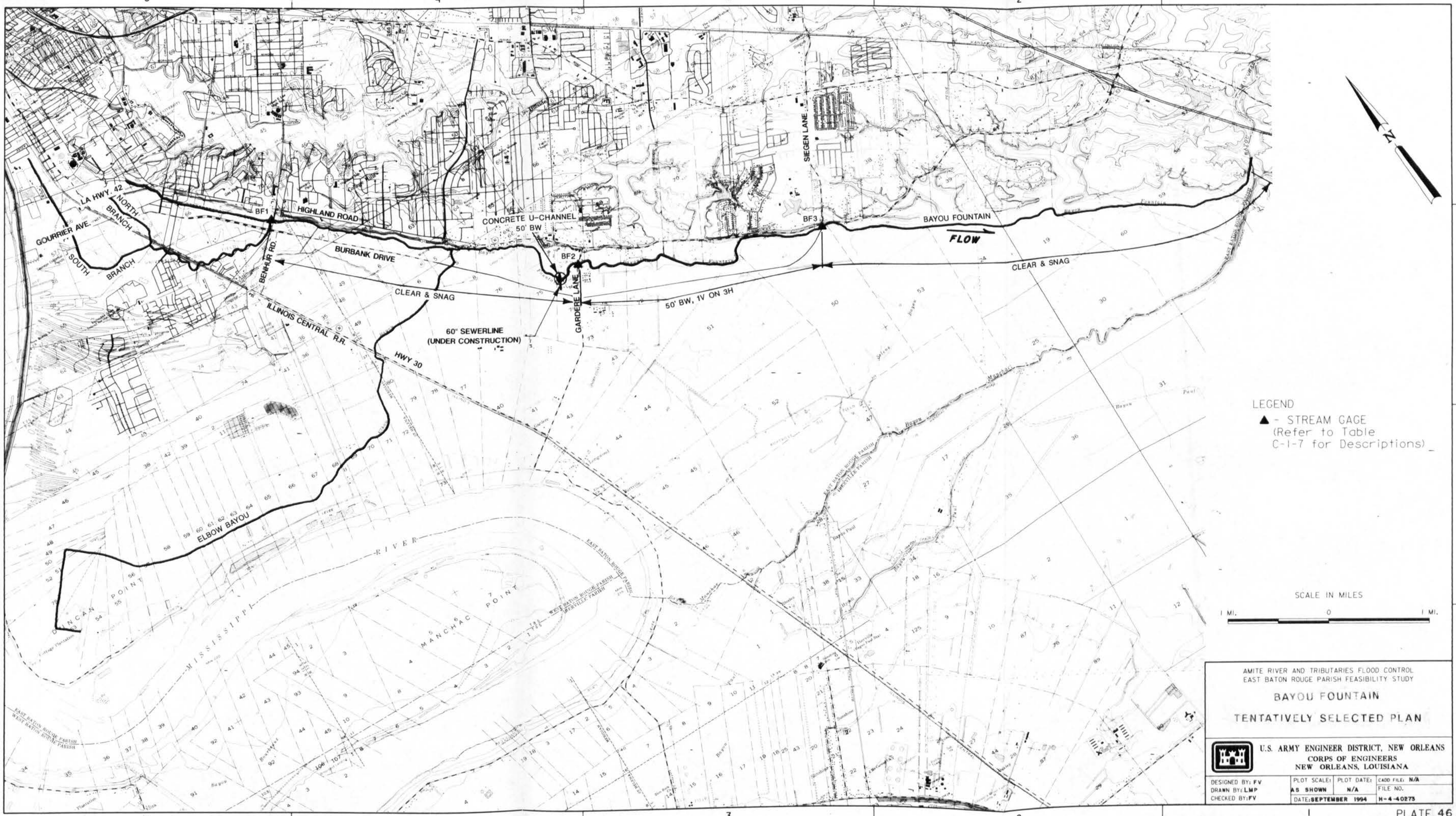
1 MI. 0 1 MI.

AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PARISH FEASIBILITY STUDY

WARD CREEK
TENTATIVELY SELECTED PLAN

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: FV DRAWN BY: L M P CHECKED BY: FV	PLOT SCALE: AS SHOWN	PLOT DATE: N/A	CADD FILE: N/A
	DATE: SEPTEMBER 1994		FILE NO. H-4-40273



AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PARISH FEASIBILITY STUDY

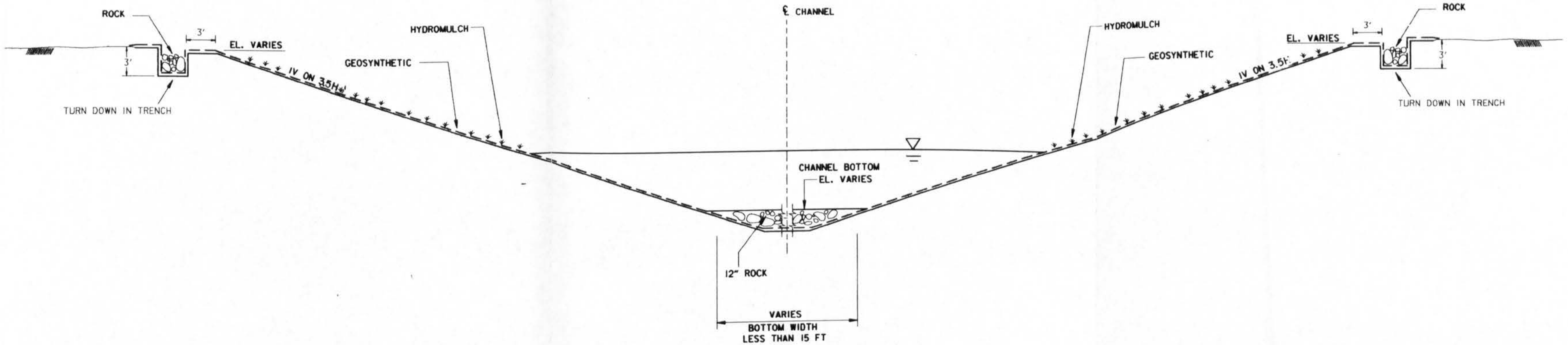
BAYOU FOUNTAIN

TENTATIVELY SELECTED PLAN

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

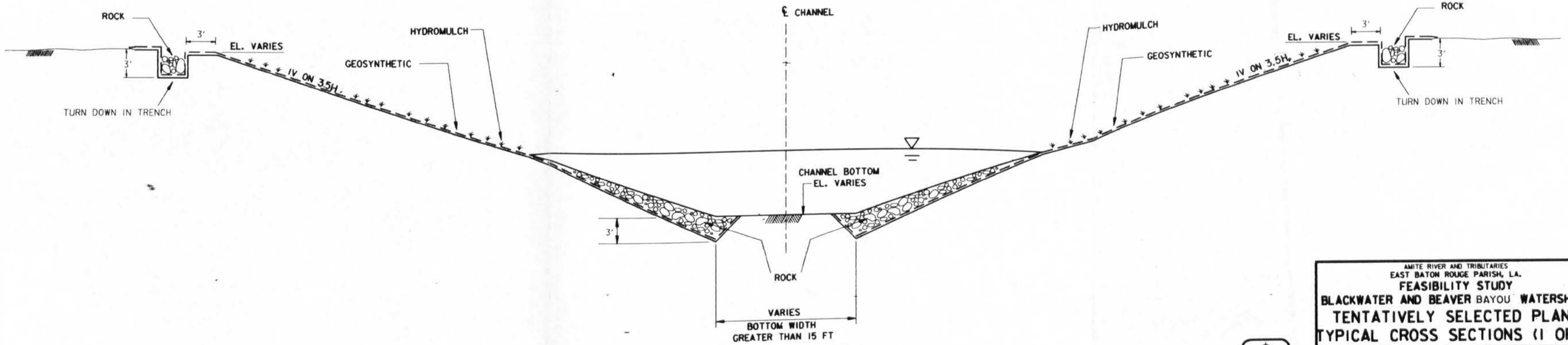
DESIGNED BY: FV	PLOT SCALE: AS SHOWN	PLOT DATE: N/A	CADD FILE: N/A
DRAWN BY: LMP			FILE NO.
CHECKED BY: FV	DATE: SEPTEMBER 1994		H-4-40273

PLATE 46



TYPICAL SECTION
BLACKWATER AND BEAVER BAYOU WATERSHED

N.T.S.



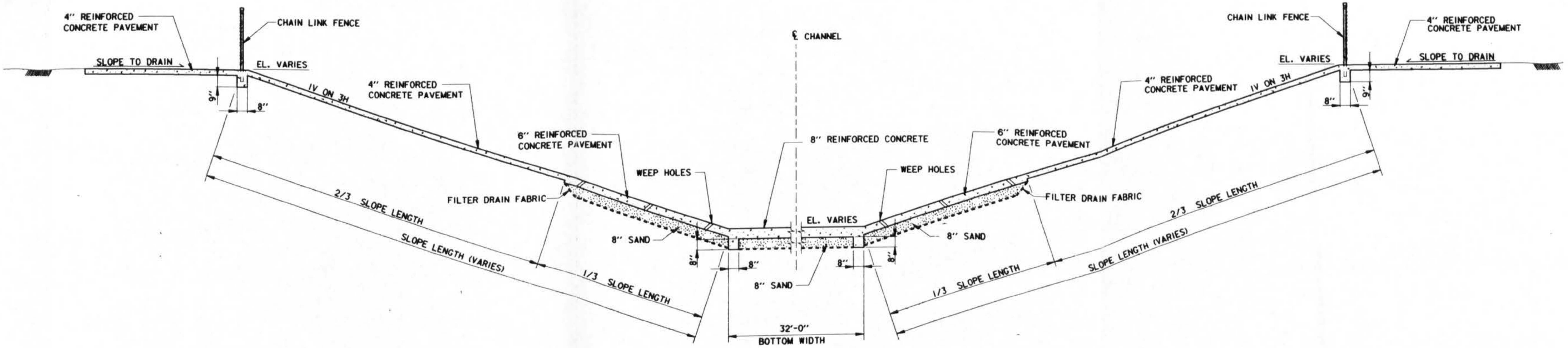
TYPICAL SECTION
BLACKWATER AND BEAVER BAYOU WATERSHED

N.T.S.

AMITE RIVER AND TRIBUTARIES
EAST BATON ROUGE PARISH, LA.
FEASIBILITY STUDY
BLACKWATER AND BEAVER BAYOU WATERSHEDS
TENTATIVELY SELECTED PLAN
TYPICAL CROSS SECTIONS (1 OF 3)

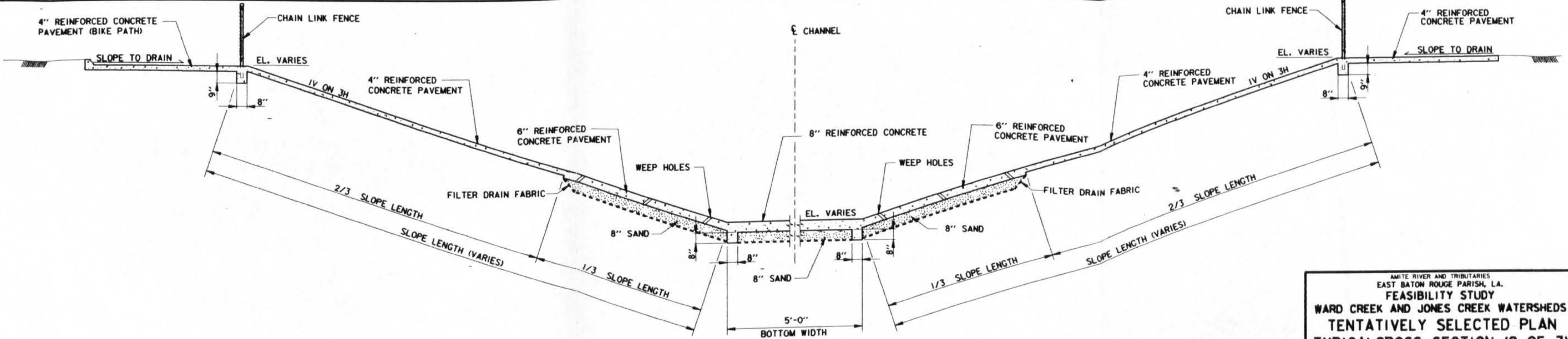
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: C. ALFONSO DRAWN BY: L. HOYT CHECKED BY: R. BROUSSARD	PLOT SCALE: 32	PLOT DATE: X	CADD FILE: WARD.DGN
	DATE: SEPTEMBER 1994		FILE NO. H-4-40273



TYPICAL SECTION
WARD CREEK WATERSHED - NORTH BRANCH

N.T.S.



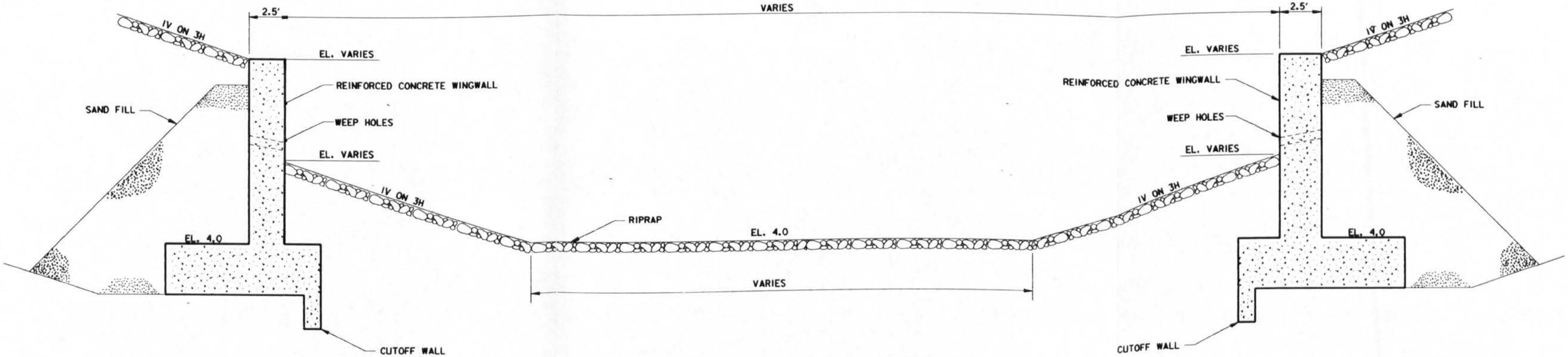
TYPICAL SECTION
JONES CREEK WATERSHED

N.T.S.

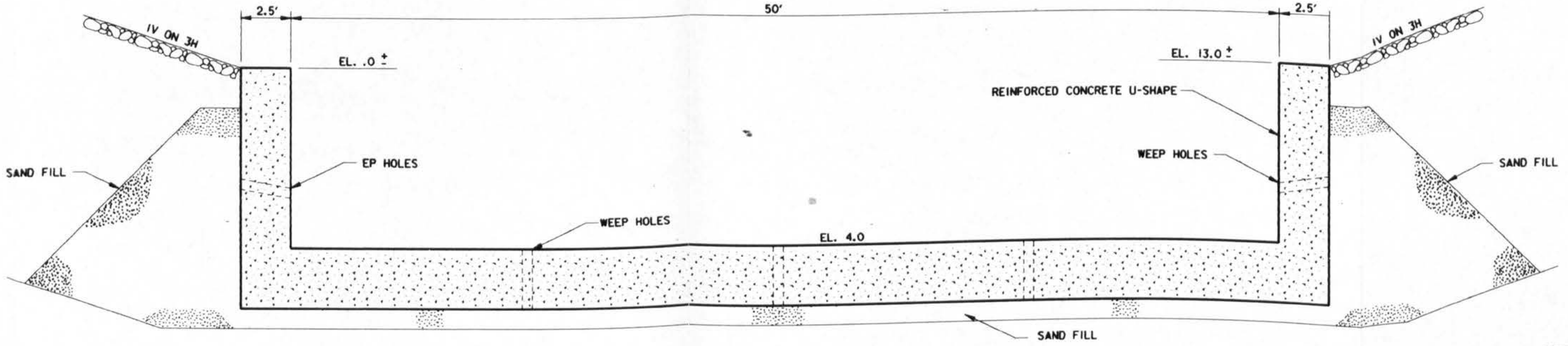
AMITE RIVER AND TRIBUTARIES
EAST BATON ROUGE PARISH, LA.
FEASIBILITY STUDY
WARD CREEK AND JONES CREEK WATERSHEDS
TENTATIVELY SELECTED PLAN
TYPICALCROSS SECTION (2 OF 3)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: TAN DRAWN BY: COUVILLION CHECKED BY: JOLISSAINT	PLOT SCALE: 32	PLOT DATE: N/A	CADD FILE: WARD.DGN
	DATE: SEPTEMBER 1994		FILE NO. H-4-40273



TYPICAL REINFORCED CONCRETE WINGWALLS



TYPICAL REINFORCED CONCRETE U-SHAPE

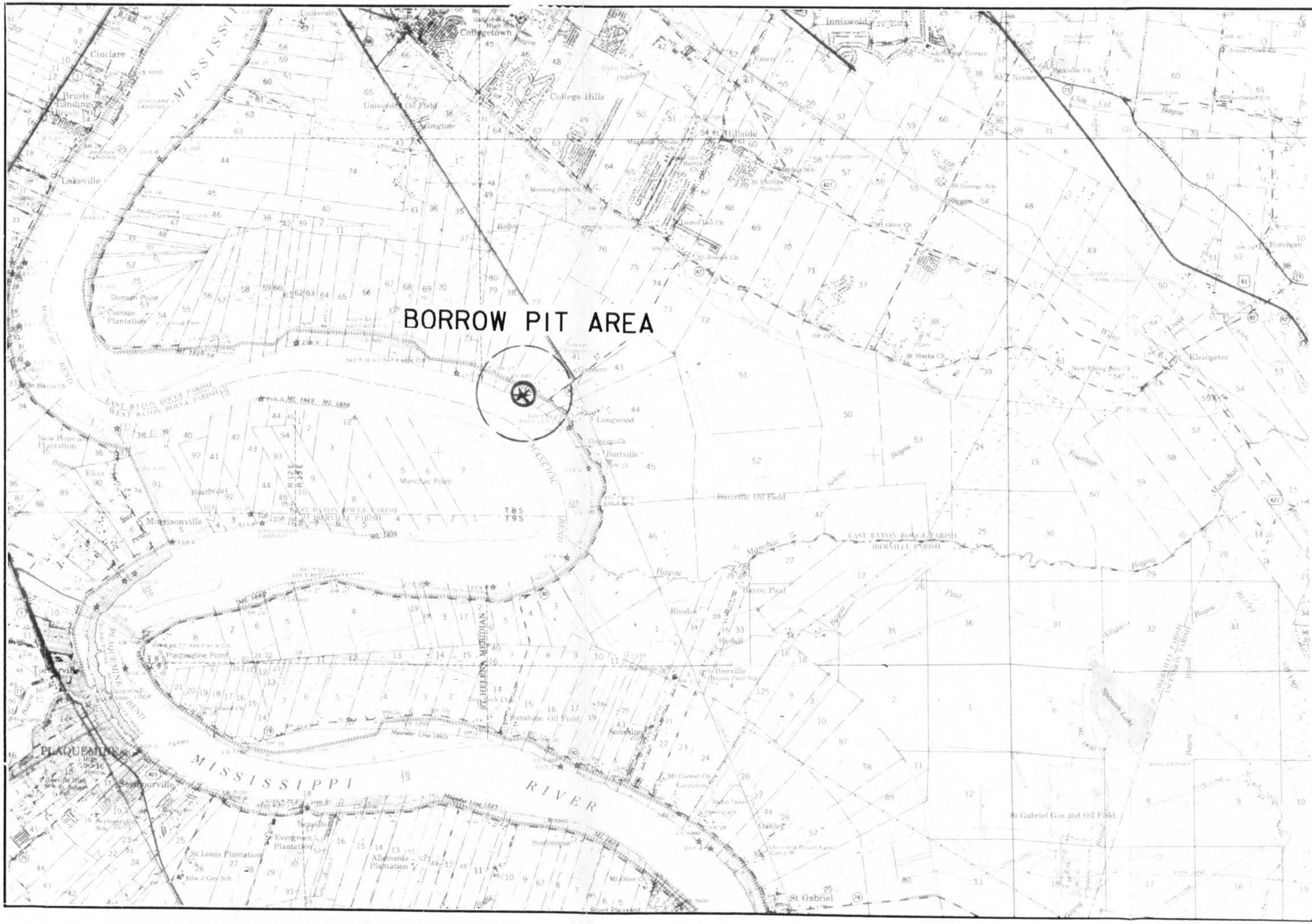
SCALE: 3/8" = 1'- 0"

12" 0 2' 4' 6' 8' 10'

AMITE RIVER AND TRIBUTARIES
EAST BATON ROUGE PARISH, LA.
FEASIBILITY STUDY
BAYOU FOUNTAIN WATERSHED
TENTATIVELY SELECTED PLAN
TYPICAL CROSS SECTION (3 OF 3)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: TAN DRAWN BY: COUVILLION CHECKED BY: JOLISSAINT	PLOT SCALE: 32	PLOT DATE: N/A	CADD FILE: FOUNTAIN.DGN
	DATE: SEPTEMBER 1994		FILE NO. H-4-40273



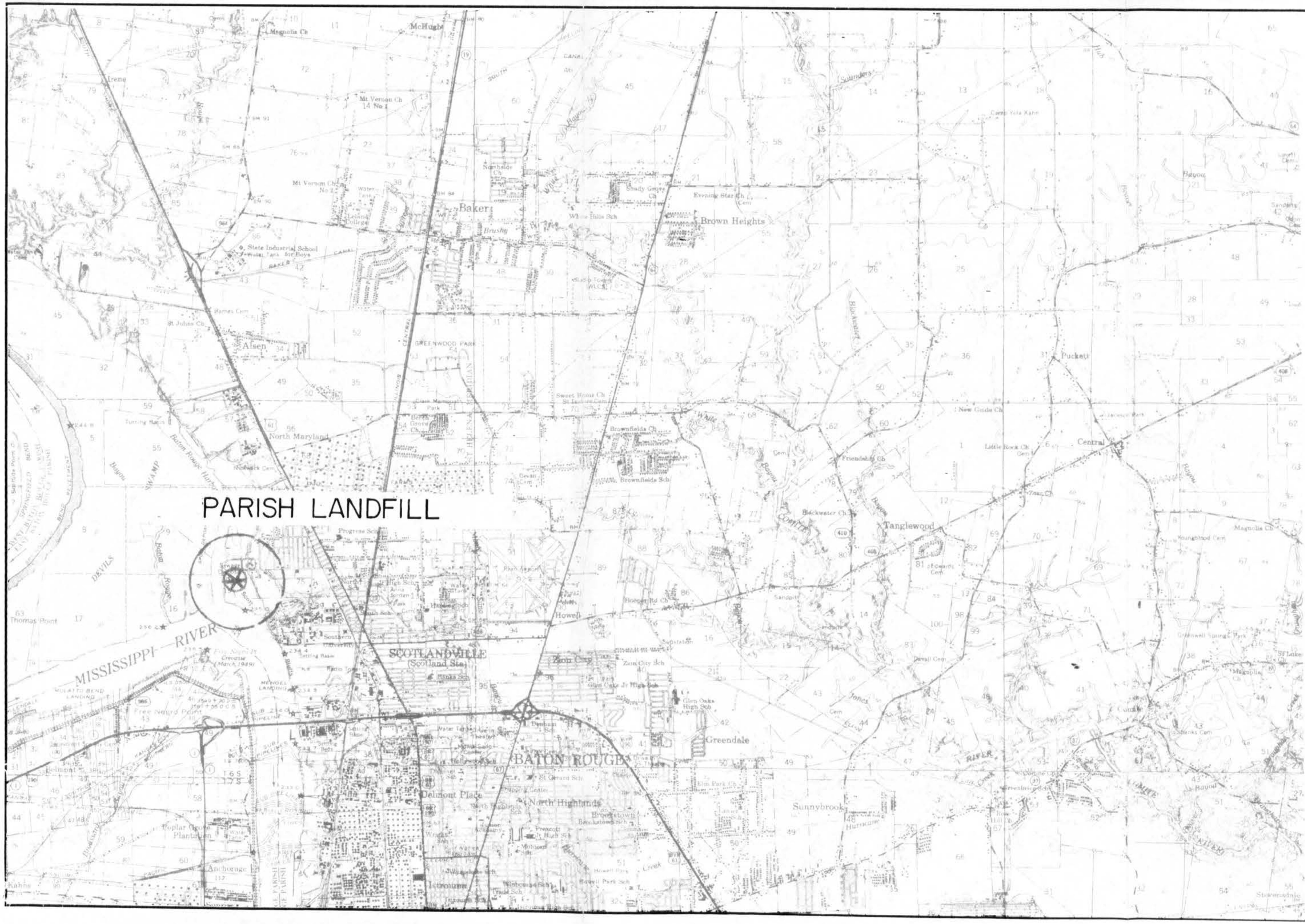
AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PARISH FEASIBILITY STUDY

TENTATIVELY SELECTED PLAN SPOIL DISPOSAL AREA

(WARD CREEK AND BAYOU FOUTAIN)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: FV DRAWN BY: LMP CHECKED BY: FV	PLOT SCALE: AS SHOWN	PLOT DATE: N/A	CADD FILE: N/A
	DATE: SEPTEMBER 1994		FILE NO. H-4-40273



AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PARISH FEASIBILITY STUDY

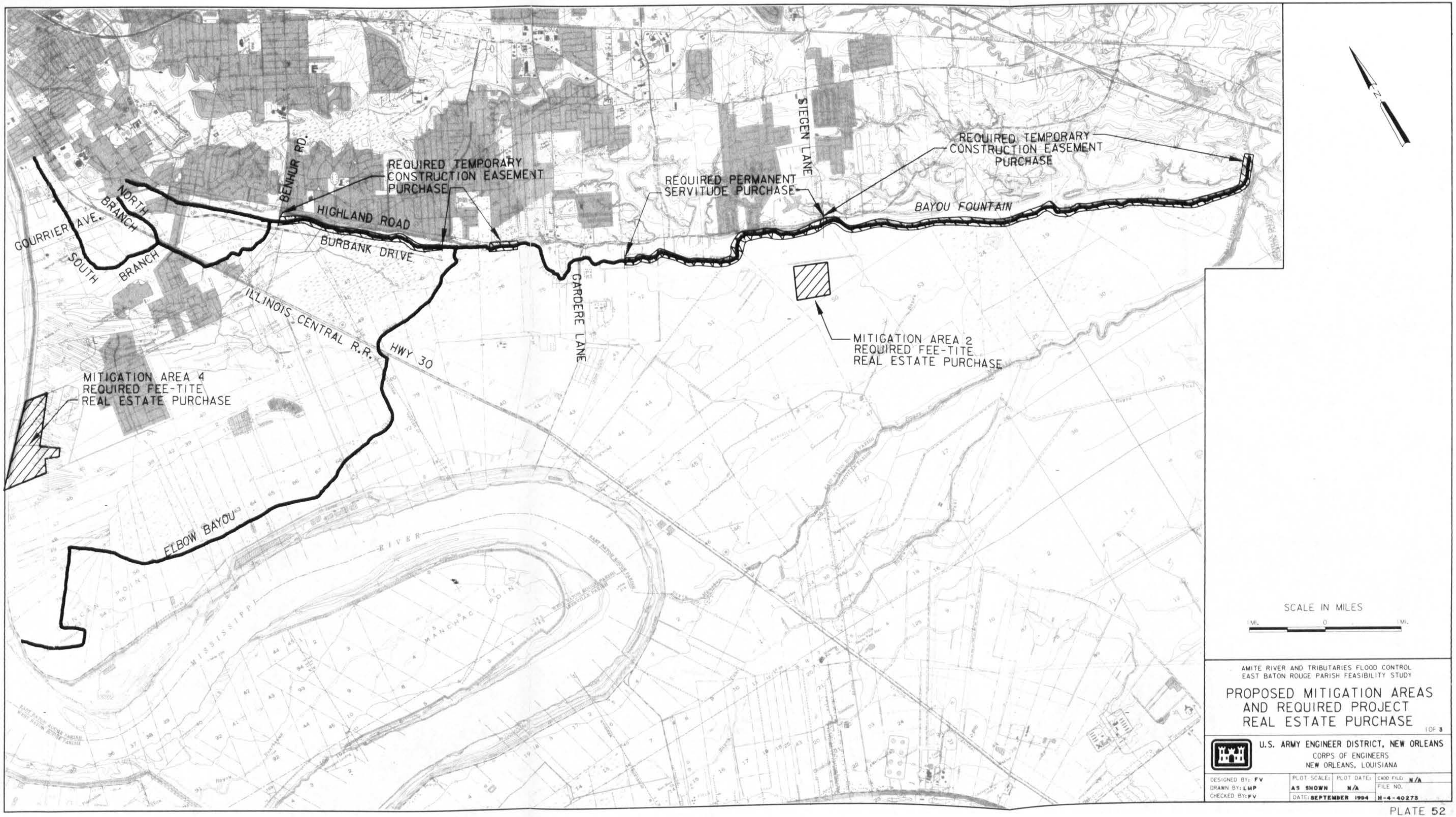
TENTATIVELY SELECTED PLAN
SPOIL DISPOSAL AREA

(BLACKWATER, BEAVER AND JONES CREEK)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: FV	PLOT SCALE:	PLOT DATE:	CADD FILE: N/A
DRAWN BY: LMP	AS SHOWN	N/A	FILE NO.
CHECKED BY: FV	DATE: SEPTEMBER 1994		H-4-40273

PLATE 51



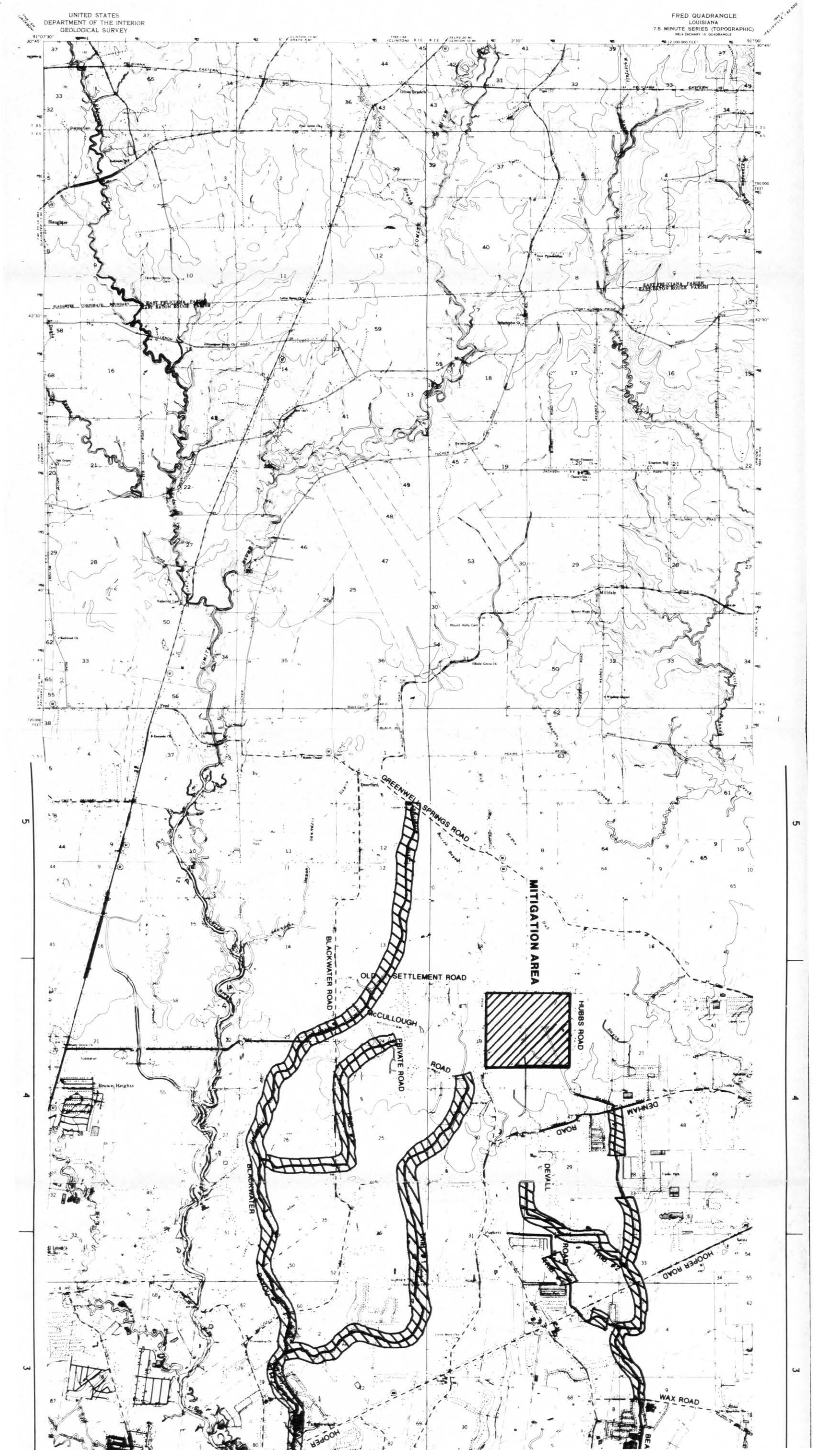
AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PARISH FEASIBILITY STUDY

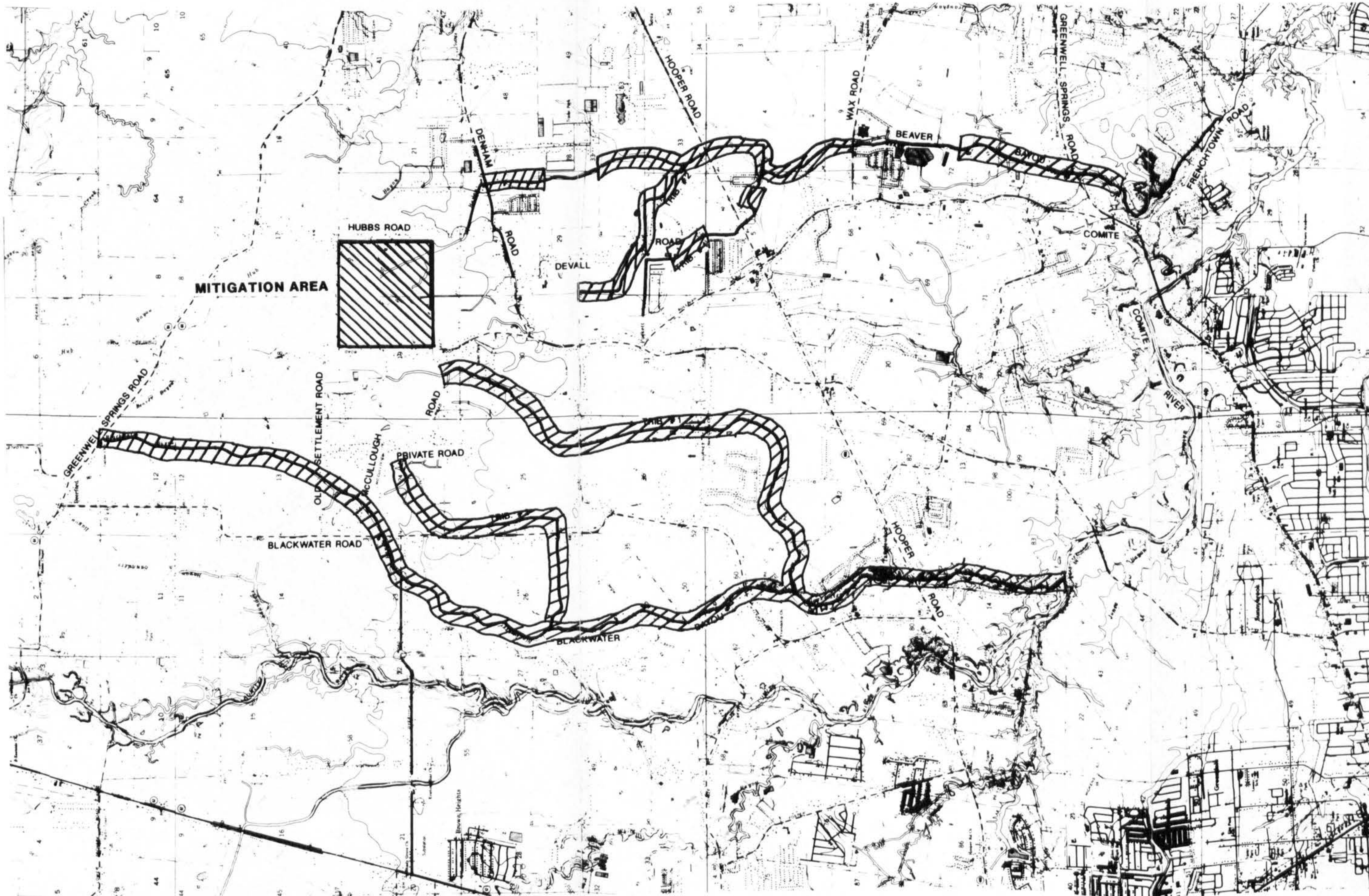
PROPOSED MITIGATION AREAS AND REQUIRED PROJECT REAL ESTATE PURCHASE

1 OF 3

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: FV	PLOT SCALE: AS SHOWN	PLOT DATE: N/A	CADD FILE: N/A
DRAWN BY: LMP			FILE NO.
CHECKED BY: FV	DATE: SEPTEMBER 1994		H-4-40273


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
FRED QUADRANGLE
LOUISIANA
7.5 MINUTE SERIES (TOPOGRAPHIC)
EAST FELICIANA PARISH
EAST BATON ROUGE PARISH
Slaughter
Milldale
Fred
Brown Heights
GREENWELL SPRINGS ROAD
MITIGATION AREA
BLACKWATER ROAD
SETTLEMENT ROAD
McCULLOUGH
ROAD
PRIVATE ROAD
HUBBS ROAD
DENHAM
ROAD
DEVALL
ROAD
BLACKWATER
HOOPER ROAD
WAX ROAD
HOOPER



REQUIRED FEE TITLE REAL ESTATE PURCHASE

REQUIRED PERMANENT SERVITUDE PURCHASE

NOTE:

LIMITS SHOWN ALONG CHANNELS NOT TO SCALE

SCALE IN MILES

1 MI. 0 1 MI.

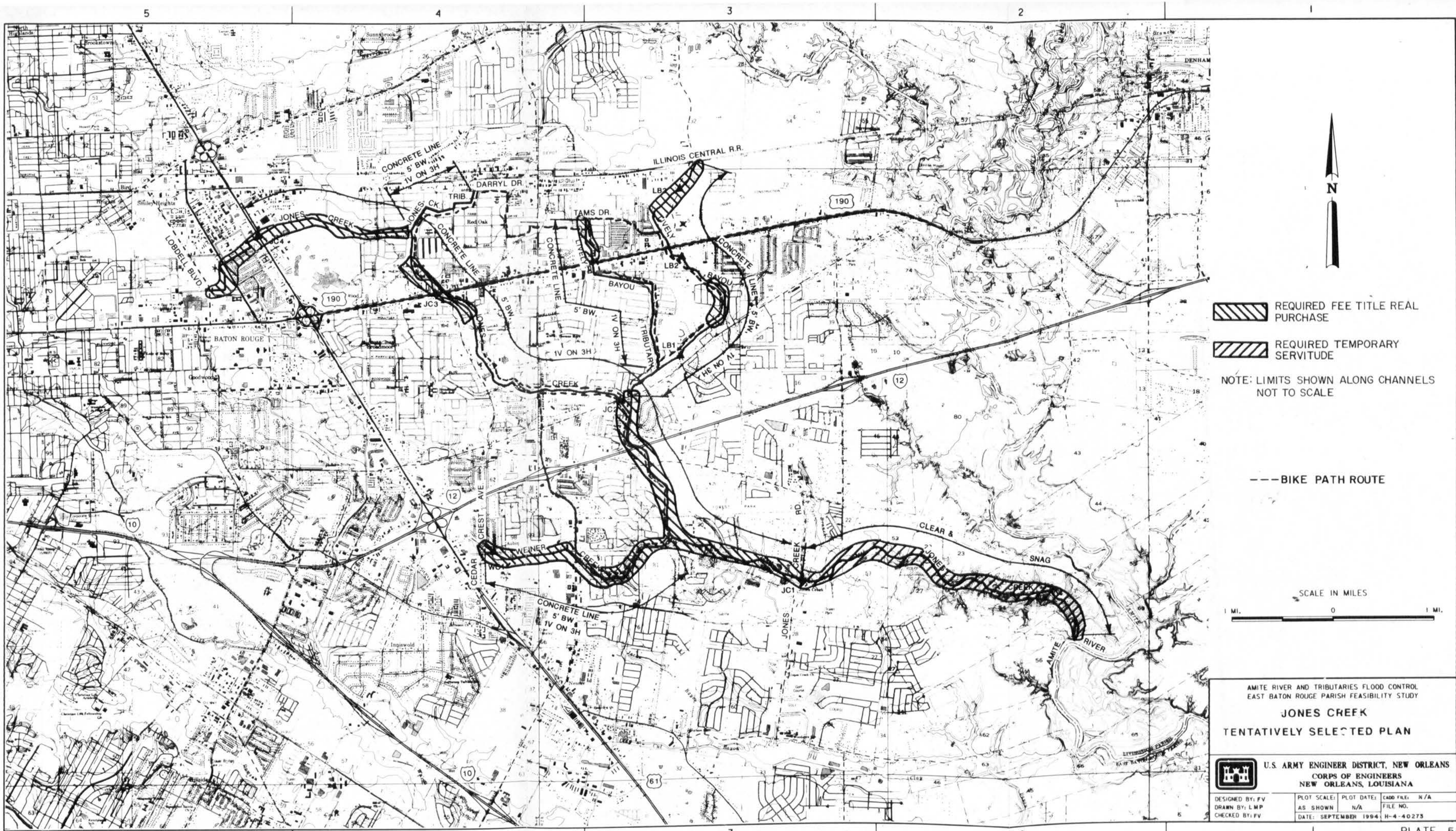
AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PARISH FEASIBILITY STUDY

PROPOSED MITIGATION AREAS AND REQUIRED PROJECT REAL ESTATE PURCHASES (2 OF 3,

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: FV	PLOT SCALE:	PLOT DATE:	CADD FILE: N/A
DRAWN BY: LMP	AS SHOWN	N/A	FILE NO.
CHECKED BY: FV	DATE: SEPTEMBER 1994		H-4-40273

PLATE 53



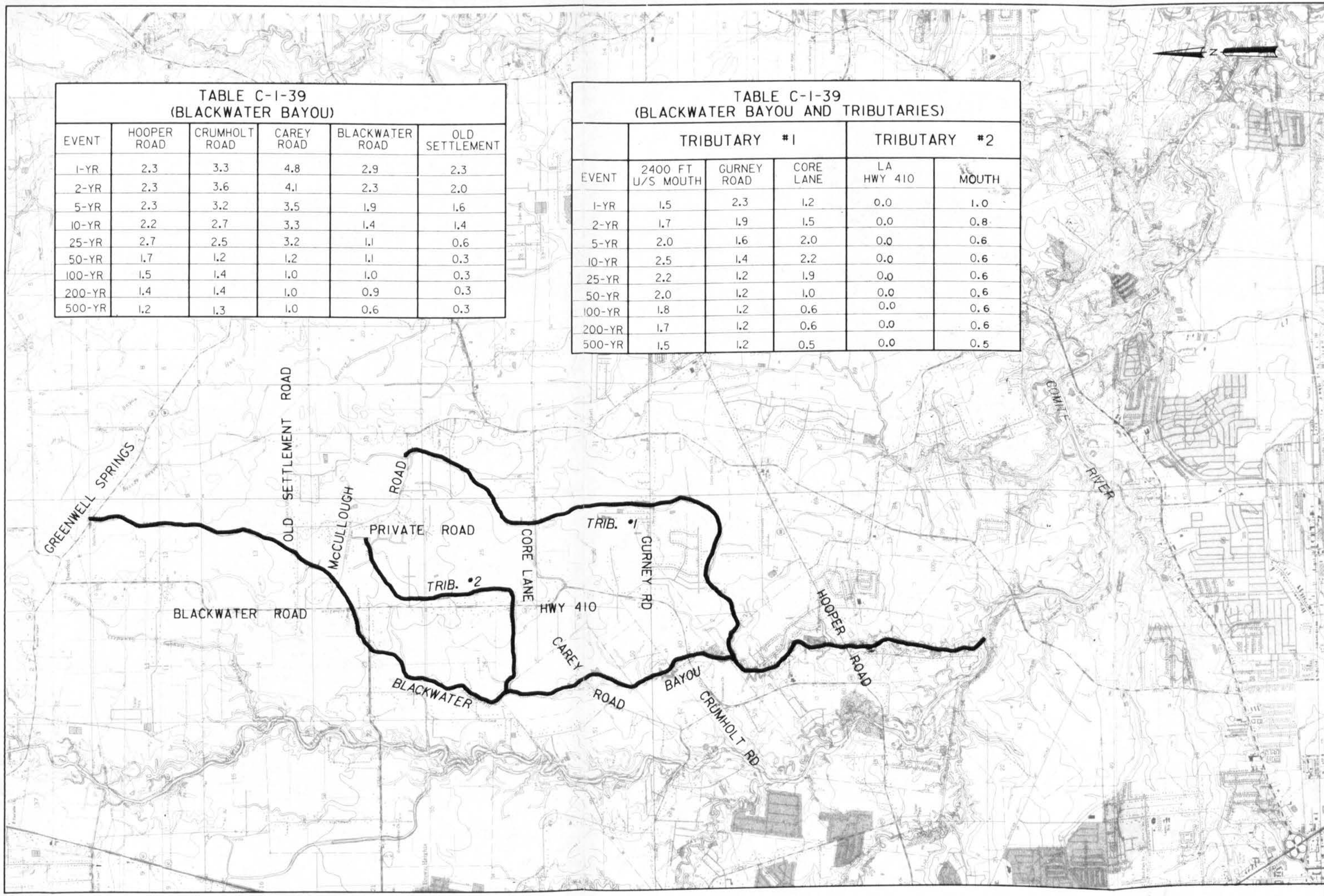
JONES CREEK
CONCRETE LINE
5' BW,
1V ON 3H
DARRYL DR.
TRIB
JONES CK
TAMS DR.
ILLINOIS CENTRAL R.R.
LB3
LB2
LB1
JC3
JC2
JC1
LIVELY
BAYOU
TRIBUTARY
CREEK
LOBDELL BLVD
190
12
10
61
BATON ROUGE
WEINER CREEK
CEDAR CREST AVE
JONES CREEK RD.
CLEAR & SNAG
AMITE RIVER
DENHAM
REQUIRED FEE TITLE REAL PURCHASE
REQUIRED TEMPORARY SERVITUDE
NOTE: LIMITS SHOWN ALONG CHANNELS NOT TO SCALE
---BIKE PATH ROUTE
SCALE IN MILES
1 MI. 0 1 MI.
N
AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PARISH FEASIBILITY STUDY
JONES CREEK
TENTATIVELY SELECTED PLAN
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA
DESIGNED BY: FV
DRAWN BY: LMP
CHECKED BY: FV
PLOT SCALE: AS SHOWN
PLOT DATE: N/A
CADD FILE: N/A
FILE NO. H-4-40273
DATE: SEPTEMBER 1994

TABLE C-1-39
(BLACKWATER BAYOU)

EVENT	HOOPER ROAD	CRUMHOLT ROAD	CAREY ROAD	BLACKWATER ROAD	OLD SETTLEMENT
1-YR	2.3	3.3	4.8	2.9	2.3
2-YR	2.3	3.6	4.1	2.3	2.0
5-YR	2.3	3.2	3.5	1.9	1.6
10-YR	2.2	2.7	3.3	1.4	1.4
25-YR	2.7	2.5	3.2	1.1	0.6
50-YR	1.7	1.2	1.2	1.1	0.3
100-YR	1.5	1.4	1.0	1.0	0.3
200-YR	1.4	1.4	1.0	0.9	0.3
500-YR	1.2	1.3	1.0	0.6	0.3

TABLE C-1-39
(BLACKWATER BAYOU AND TRIBUTARIES)

	TRIBUTARY #1			TRIBUTARY #2	
EVENT	2400 FT U/S MOUTH	GURNEY ROAD	CORE LANE	LA HWY 410	MOUTH
1-YR	1.5	2.3	1.2	0.0	1.0
2-YR	1.7	1.9	1.5	0.0	0.8
5-YR	2.0	1.6	2.0	0.0	0.6
10-YR	2.5	1.4	2.2	0.0	0.6
25-YR	2.2	1.2	1.9	0.0	0.6
50-YR	2.0	1.2	1.0	0.0	0.6
100-YR	1.8	1.2	0.6	0.0	0.6
200-YR	1.7	1.2	0.6	0.0	0.6
500-YR	1.5	1.2	0.5	0.0	0.5



AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PARISH FEASIBILITY STUDY

BLACKWATER BAYOU AND TRIBUTARIES

TENTATIVELY SELECTED PLAN
EXPECTED STAGE LOWERINGS
(WITH COMITE RIVER DIVERSION IN PLACE)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: FV	PLOT SCALE:	PLOT DATE:	CADD FILE: N/A
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CHECKED BY: FV	DATE: SEPTEMBER 1994		H-4-40273

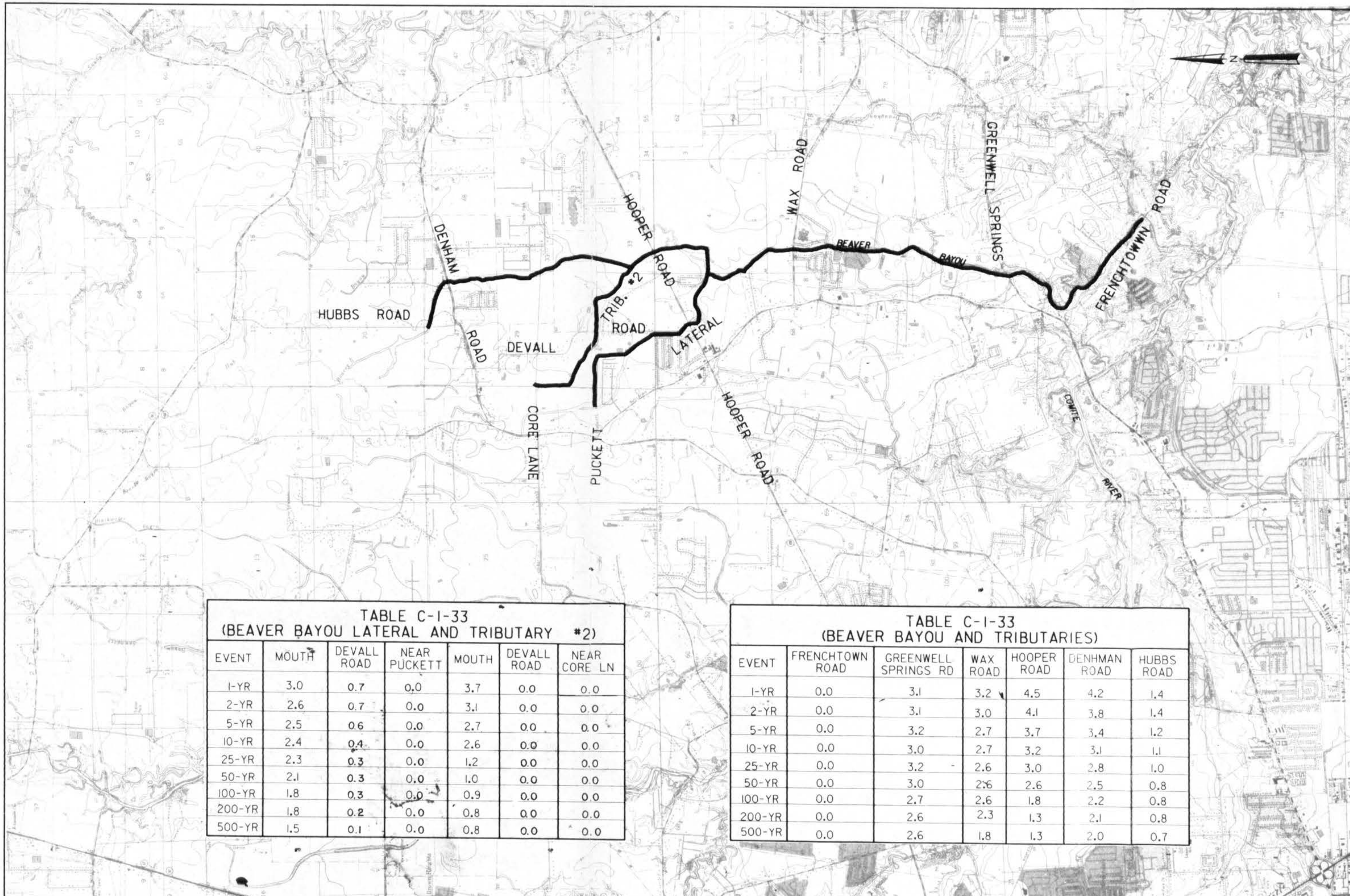

TABLE C-1-33
(BEAVER BAYOU LATERAL AND TRIBUTARY #2)

EVENT	MOUTH	DEVALL ROAD	NEAR PUCKETT	MOUTH	DEVALL ROAD	NEAR CORE LN
1-YR	3.0	0.7	0.0	3.7	0.0	0.0
2-YR	2.6	0.7	0.0	3.1	0.0	0.0
5-YR	2.5	0.6	0.0	2.7	0.0	0.0
10-YR	2.4	0.4	0.0	2.6	0.0	0.0
25-YR	2.3	0.3	0.0	1.2	0.0	0.0
50-YR	2.1	0.3	0.0	1.0	0.0	0.0
100-YR	1.8	0.3	0.0	0.9	0.0	0.0
200-YR	1.8	0.2	0.0	0.8	0.0	0.0
500-YR	1.5	0.1	0.0	0.8	0.0	0.0

TABLE C-1-33
(BEAVER BAYOU AND TRIBUTARIES)

EVENT	FRENCHTOWN ROAD	GREENWELL SPRINGS RD	WAX ROAD	HOOPER ROAD	DENHMAN ROAD	HUBBS ROAD
1-YR	0.0	3.1	3.2	4.5	4.2	1.4
2-YR	0.0	3.1	3.0	4.1	3.8	1.4
5-YR	0.0	3.2	2.7	3.7	3.4	1.2
10-YR	0.0	3.0	2.7	3.2	3.1	1.1
25-YR	0.0	3.2	2.6	3.0	2.8	1.0
50-YR	0.0	3.0	2.6	2.6	2.5	0.8
100-YR	0.0	2.7	2.6	1.8	2.2	0.8
200-YR	0.0	2.6	2.3	1.3	2.1	0.8
500-YR	0.0	2.6	1.8	1.3	2.0	0.7

SCALE IN MILES

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AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PARISH FEASIBILITY STUDY

BEAVER BAYOU AND TRIBUTARIES

TENTATIVELY SELECTED PLAN
EXPECTED STAGE LOWERINGS
(WITH COMITE RIVER DIVERSION IN PLACE)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

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CHECKED BY: FV	DATE SEPTEMBER 1994		H-4-40273

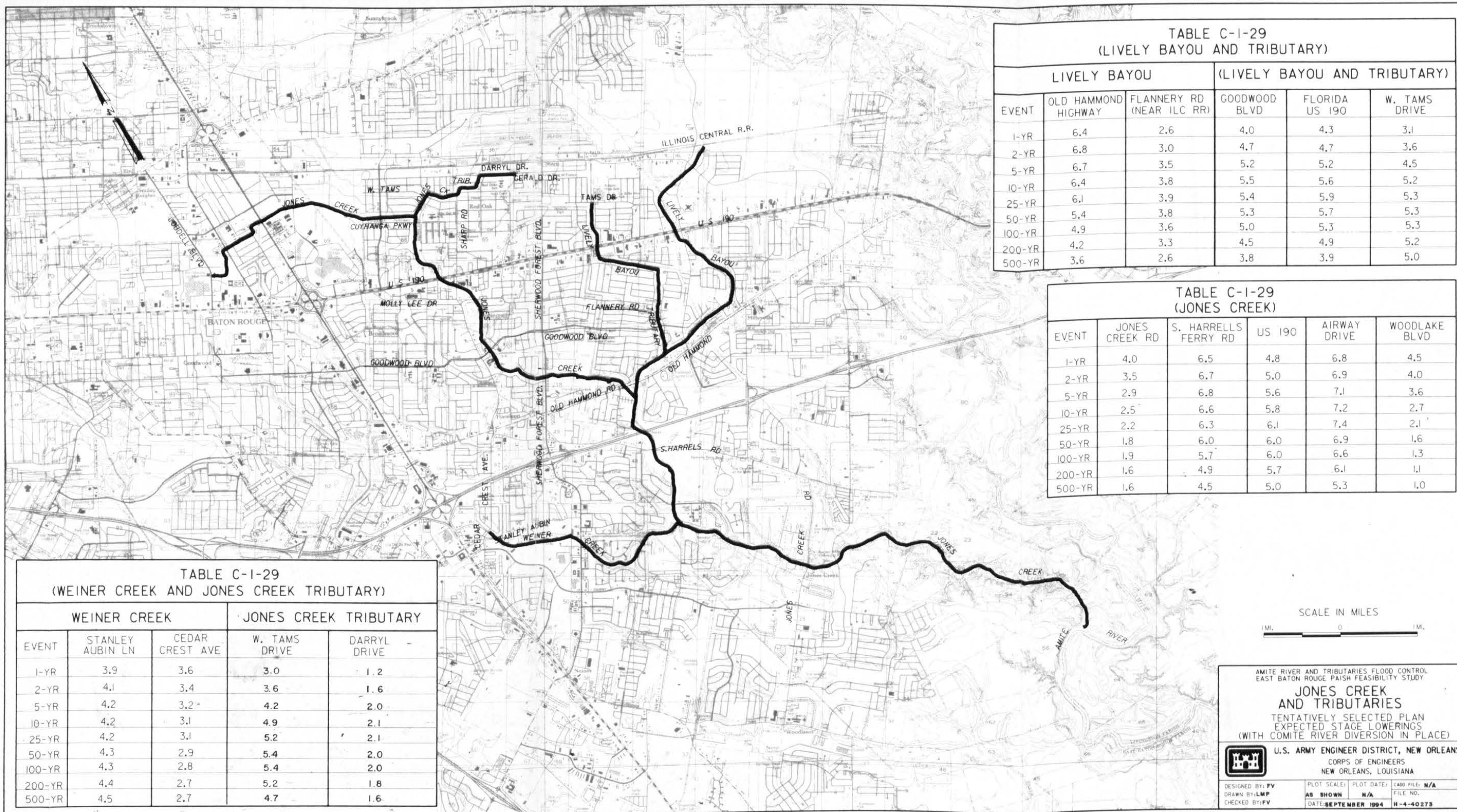

TABLE C-1-29
(LIVELY BAYOU AND TRIBUTARY)

	LIVELY BAYOU		(LIVELY BAYOU AND TRIBUTARY)		
EVENT	OLD HAMMOND HIGHWAY	FLANNERY RD (NEAR ILC RR)	GOODWOOD BLVD	FLORIDA US 190	W. TAMS DRIVE
1-YR	6.4	2.6	4.0	4.3	3.1
2-YR	6.8	3.0	4.7	4.7	3.6
5-YR	6.7	3.5	5.2	5.2	4.5
10-YR	6.4	3.8	5.5	5.6	5.2
25-YR	6.1	3.9	5.4	5.9	5.3
50-YR	5.4	3.8	5.3	5.7	5.3
100-YR	4.9	3.6	5.0	5.3	5.3
200-YR	4.2	3.3	4.5	4.9	5.2
500-YR	3.6	2.6	3.8	3.9	5.0

TABLE C-1-29
(JONES CREEK)

EVENT	JONES CREEK RD	S. HARRELLS FERRY RD	US 190	AIRWAY DRIVE	WOODLAKE BLVD
1-YR	4.0	6.5	4.8	6.8	4.5
2-YR	3.5	6.7	5.0	6.9	4.0
5-YR	2.9	6.8	5.6	7.1	3.6
10-YR	2.5	6.6	5.8	7.2	2.7
25-YR	2.2	6.3	6.1	7.4	2.1
50-YR	1.8	6.0	6.0	6.9	1.6
100-YR	1.9	5.7	6.0	6.6	1.3
200-YR	1.6	4.9	5.7	6.1	1.1
500-YR	1.6	4.5	5.0	5.3	1.0

TABLE C-1-29
(WEINER CREEK AND JONES CREEK TRIBUTARY)

	WEINER CREEK		JONES CREEK TRIBUTARY	
EVENT	STANLEY AUBIN LN	CEDAR CREST AVE	W. TAMS DRIVE	DARRYL DRIVE
1-YR	3.9	3.6	3.0	1.2
2-YR	4.1	3.4	3.6	1.6
5-YR	4.2	3.2	4.2	2.0
10-YR	4.2	3.1	4.9	2.1
25-YR	4.2	3.1	5.2	2.1
50-YR	4.3	2.9	5.4	2.0
100-YR	4.3	2.8	5.4	2.0
200-YR	4.4	2.7	5.2	1.8
500-YR	4.5	2.7	4.7	1.6

AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PAISH FEASIBILITY STUDY

JONES CREEK AND TRIBUTARIES

TENTATIVELY SELECTED PLAN
EXPECTED STAGE LOWERINGS
(WITH COMITE RIVER DIVERSION IN PLACE)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

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PLATE 57

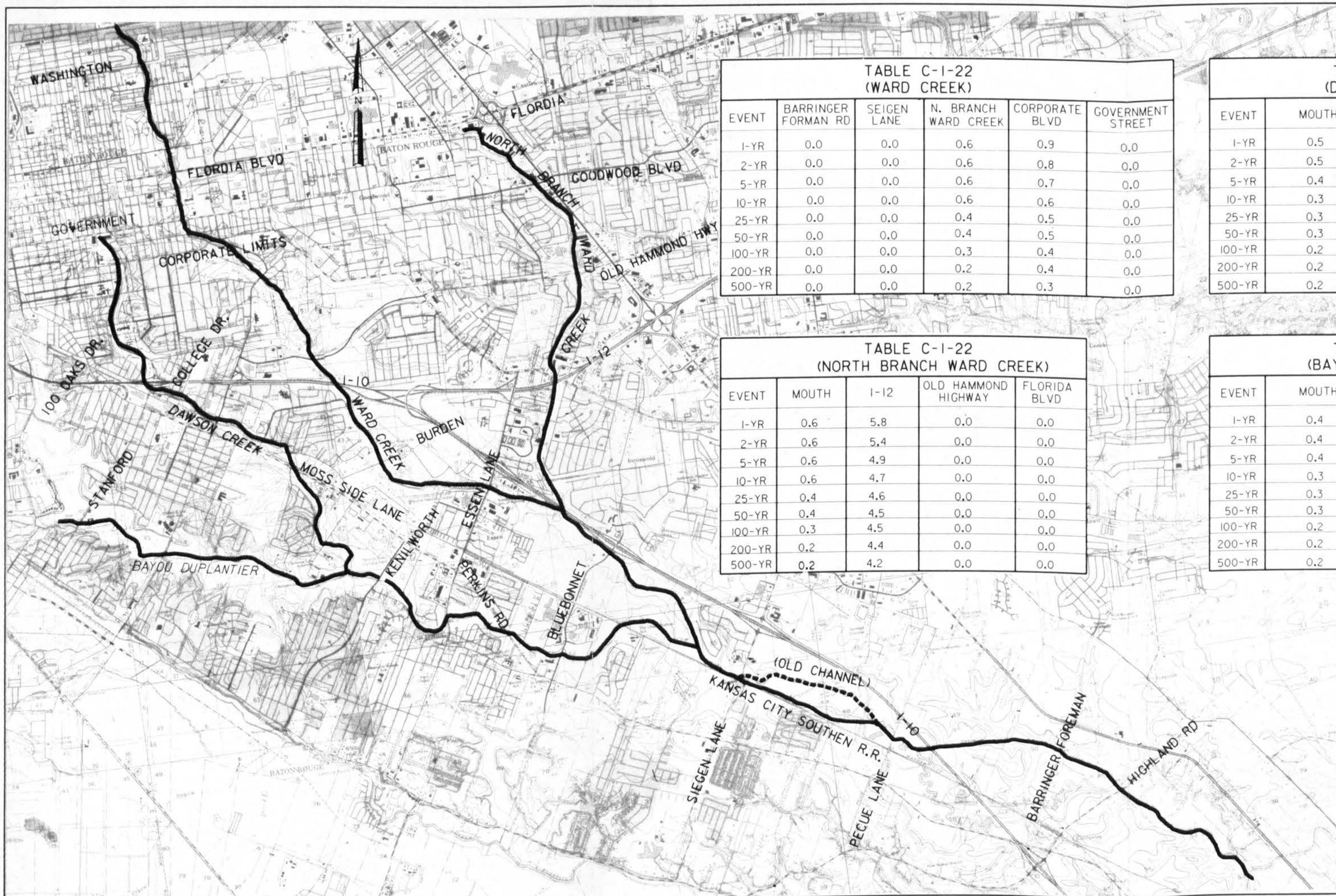

TABLE C-1-22
(WARD CREEK)

EVENT	BARRINGER FORMAN RD	SEIGEN LANE	N. BRANCH WARD CREEK	CORPORATE BLVD	GOVERNMENT STREET
1-YR	0.0	0.0	0.6	0.9	0.0
2-YR	0.0	0.0	0.6	0.8	0.0
5-YR	0.0	0.0	0.6	0.7	0.0
10-YR	0.0	0.0	0.6	0.6	0.0
25-YR	0.0	0.0	0.4	0.5	0.0
50-YR	0.0	0.0	0.4	0.5	0.0
100-YR	0.0	0.0	0.3	0.4	0.0
200-YR	0.0	0.0	0.2	0.4	0.0
500-YR	0.0	0.0	0.2	0.3	0.0

TABLE C-1-22
(DAWSON CREEK)

EVENT	MOUTH	BLUEBONNET STREET	MOSS SIDE LANE
1-YR	0.5	0.2	0.2
2-YR	0.5	0.2	0.2
5-YR	0.4	0.2	1.0
10-YR	0.3	0.2	1.0
25-YR	0.3	0.2	0.0
50-YR	0.3	0.2	0.0
100-YR	0.2	0.2	0.0
200-YR	0.2	0.2	0.0
500-YR	0.2	0.2	0.0

TABLE C-1-22
(NORTH BRANCH WARD CREEK)

EVENT	MOUTH	I-12	OLD HAMMOND HIGHWAY	FLORIDA BLVD
1-YR	0.6	5.8	0.0	0.0
2-YR	0.6	5.4	0.0	0.0
5-YR	0.6	4.9	0.0	0.0
10-YR	0.6	4.7	0.0	0.0
25-YR	0.4	4.6	0.0	0.0
50-YR	0.4	4.5	0.0	0.0
100-YR	0.3	4.5	0.0	0.0
200-YR	0.2	4.4	0.0	0.0
500-YR	0.2	4.2	0.0	0.0

TABLE C-1-22
(BAYOU DUPLANTIER)

EVENT	MOUTH	COLLEGE (LEE) DRIVE	STANFORD AVENUE
1-YR	0.4	0.4	0.4
2-YR	0.4	0.4	0.4
5-YR	0.4	0.4	0.4
10-YR	0.3	0.3	0.3
25-YR	0.3	0.3	0.3
50-YR	0.3	0.3	0.3
100-YR	0.2	0.2	0.2
200-YR	0.2	0.2	0.2
500-YR	0.2	0.2	0.2

AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PARISH FEASIBILITY STUDY

WARD CREEK AND TRIBUTARIES

TENTATIVELY SELECTED PLAN
EXPECTED STAGE LOWERING
(WITH COMITE RIVER DIVERSION IN PLACE)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
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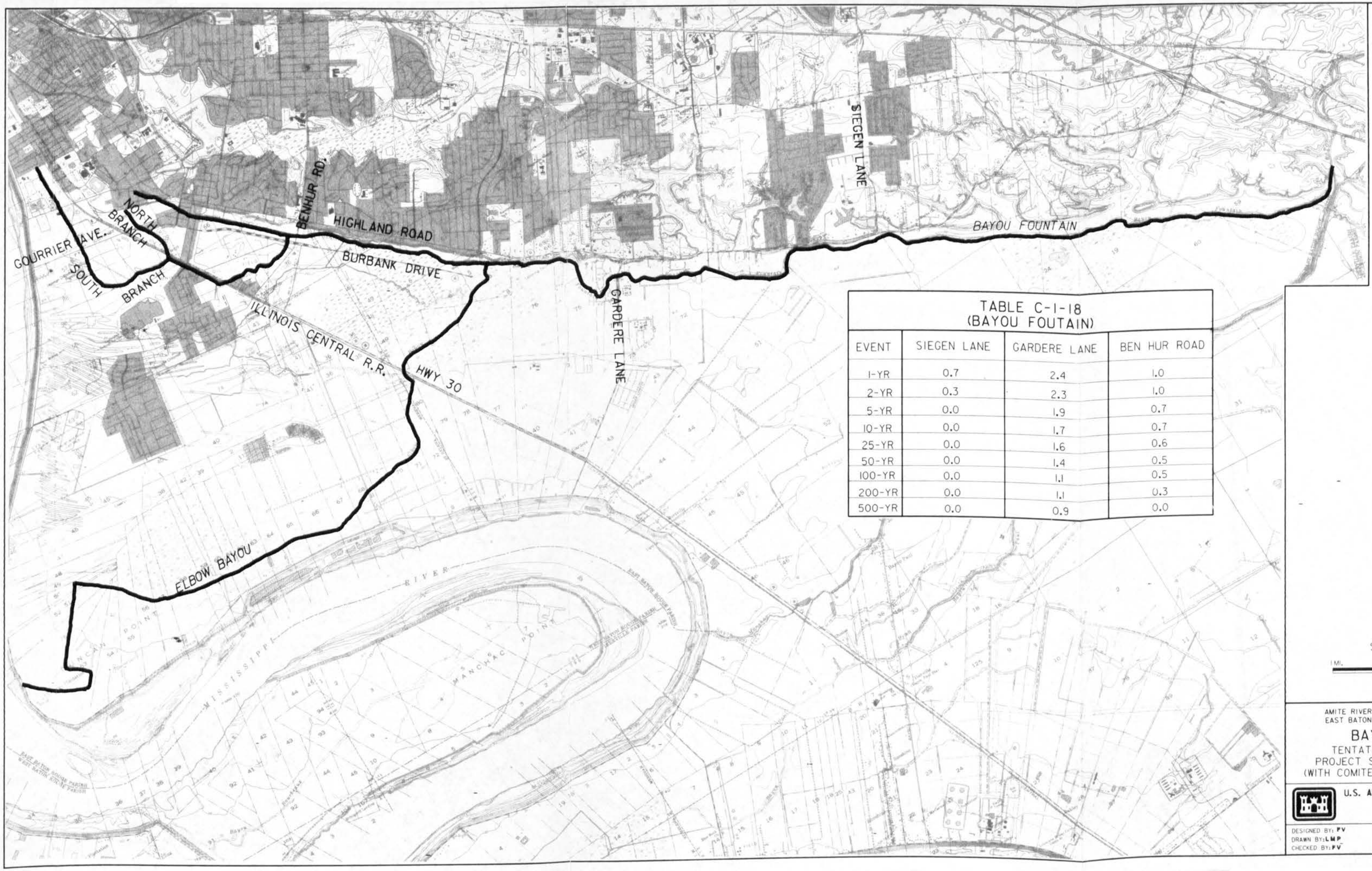

TABLE C-1-18
(BAYOU FOUTAIN)

EVENT	SIEGEN LANE	GARDERE LANE	BEN HUR ROAD
1-YR	0.7	2.4	1.0
2-YR	0.3	2.3	1.0
5-YR	0.0	1.9	0.7
10-YR	0.0	1.7	0.7
25-YR	0.0	1.6	0.6
50-YR	0.0	1.4	0.5
100-YR	0.0	1.1	0.5
200-YR	0.0	1.1	0.3
500-YR	0.0	0.9	0.0

AMITE RIVER AND TRIBUTARIES FLOOD CONTROL
EAST BATON ROUGE PARISH FEASIBILITY STUDY

BAYOU FOUNTAIN

TENTATIVELY SELECTED PLAN
PROJECT STAGE REDUCTIONS (FEET)
(WITH COMITE RIVER DIVERSION IN PLACE)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
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